Appendix B

Upper Amargosa Creek Recharge Project
EIR
Public Draft

Prepared for

City of Palmdale

Prepared by

Science Applications International Corporation

July 2009

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Acronyms

°C	Degrees Celsius
°F	degrees Fahrenheit
µg/m3	Micrograms per Cubic Meter
AAQS	Ambient Air Quality Standard
AB	Assembly Bill
AES	Aesthetics
AF	Acre Feet
AFD	Acre Feet per Day
AFY	Acre Feet per Year
AIRFA	American Indian Religious Freedom Act of 1978
ARPA	Archaeological Resources Protection Act of 1979
AVAQMD	Antelope Valley Air Quality Management District
AVEK	Antelope Valley-East Kern Water Agency
BLM	Bureau of Land Management
BMPs	Best Management Practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal-EPA	California Environmental Protection Agency
CalIPC	California Invasive Plant
CalTrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act of 1988
CCAR	California Climate Action Registry
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
cfs	Cubic Feet per Second
CH4	Methane
CHIE	Cumulative Human Impact Evaluation
City	City of Palmdale
cm3	Cubic Meters
CNDDB	California Natural Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO2	carbon dioxide
CRHR	California Register of Historical Resources
CUPAs	Certified Unified Program Agencies
DAF	Department of Agriculture and Food
dB	Decibel
dBA	A-Weighted Sound Level
DOT	California Department of Transportation (DOT)
DPM	Diesel particulate matter
DTSC	California Department of Toxic Substance Control
EIR	Environmental Impact Report
EO	Executive Order
EPA	Environmental Protection Agency

EPCRA	Emergency Planning and Community Right-To-Know Act
ESA	Environmental Site Assessment
ESA	Endangered Species Act
eWRIMS	Water Rights Information Management System
FHWA	Federal Highway Administration
ft bgs	Feet Below Ground Surface
City	City of Palmdale
GHG	greenhouse gases
GWP	global warming potential
HRA	health risk assessment
Hz	hertz
in	inch
IRWMP	Integrated Regional Water Management Plan
IS	Initial Study
LACFD	Los Angeles County Fire Department
LCID	Littlerock Creek Irrigation District
LDR	Low Density Residential
LEPC	Local Emergency Planning Committee
Leq	Equivalent Noise Level
LRWQCB	Lahontan Regional Water Quality Control Board
MBTA	Migratory Bird Treaty Act
MCE	maximum credible earthquake
MCL	maximum contaminant level
MDAB	Mojave Desert Air Basin
mg/L	Milligrams per Letter
Mm	millimeter
MOU	Memorandum of Understanding
Mya	Million Years Ago
n/a	Not Available
N2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAHC	Native American Heritage Commission (NAHC).
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO2	nitrogen dioxide
NOP	Notice of Preparation
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Historic Preservation Act
O3	ozone (O3)
OEHHA	Office of Environmental Health Hazard Assessment
PERP	Portable Equipment Registration Program
PM10	particulate matter less than 10 microns in diameter
PM2.5	particulate matter less than 2.5 microns in diameter
ppm	Parts per Million
Project	Upper Amargosa Project
PWD	Palmdale Water District
RCRA	Resource Conservation and Recovery Act of 1976
SAA	Streambed Alteration Agreement
SAIC	Science Applications International Corporation

SAIC WR	Water Resources Evaluation of Amargosa Creek in Appendix C
SARA	Superfund Amendments and Reauthorization Act
SCAB	South Coast Air Basin
SEA	Antelope Valley Significant Ecological Area
SERC	State Emergency Response Commission
SIP	State Implementation Plan
SO2	sulfur dioxide
SOx	Oxides of Sulfur
SRF	Single Family Residence
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
UAP	Upper Amargosa Project
UBC	Uniform Building Code
UFP	ultrafine particles
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geologic Survey
VOC	volatile organic compounds
WRI	World Resources Institute

Executive Summary

Introduction

The City of Palmdale (City) has prepared this Environmental Impact Report (EIR) to identify and evaluate the potential environmental impacts associated with implementing the proposed Upper Amargosa Project (UAP) (hereinafter "Project"). The City is the lead agency under the California Environmental Quality Act (CEQA), and is responsible for preparation of the EIR. The purpose of this document is to inform the public and decision-makers at the permitting agencies about the potential adverse and beneficial environmental impacts of the proposed project and its alternatives, and to recommend all feasible mitigation measures for significant impacts.

This EIR fulfills the requirements of CEQA (Public Resources Code, Section 21000 *et seq*.) and CEQA Guidelines (14 California Code of Regulations [CCR], Section 15000 *et seq.)*. According to CEQA Guidelines Section 15121(a) (CCR, Title 14, Division 6, Chapter 3), the purpose of an EIR is to serve as an informational document that:

> *…will inform public agency decision-makers and the public generally of the significant environmental effect of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project.*

This EIR evaluates the direct, indirect, and cumulative impacts of the project in accordance with the provisions set forth in the CEQA Guidelines. It will be used to address potentially significant environmental issues and to recommend mitigation measures that, where feasible, could reduce or eliminate significant environmental impacts.

Other state and local agencies that have jurisdiction or regulatory responsibility over components of the project would also rely on this EIR for CEQA compliance as part of their decision-making processes.

Project Background

The Antelope Valley Region of California has experienced a rapid increase in population over the past few decades. The number of residents within the Antelope Valley Region expanded more than 330 percent between 1970 and 2005, growing from 103,000 people in 1970 to 444,000 people in 2005. Forecasts predict the population to continue to swell, potentially reaching 1,174,000 residents by the year 2035.

The water currently used in the Antelope Valley Region comes from two sources: (1) naturally occurring water within the Antelope Valley Region (surface water and groundwater accumulated from rain and snow that falls in the Antelope Valley and surrounding mountains), and (2) State Water Project water (surface water that is collected in northern California and imported via the California Aqueduct into the Antelope Valley and other areas around the state). Water managers and local planners are looking for ways to provide reliable water supply to meet the Antelope Valley Region's future water demand.

Project Purpose and Need

The City is a participant in the IRWMP, a multi-agency collaborative effort developed to address regional concerns about water supply reliability, water quality, flood protection, environmental resources, and land use management in the Antelope Valley. One of the objectives of the IRWMP is to reduce the mismatch

between water supply and water demand in the region. The UAP, one of several projects proposed in the IRWMP, would increase the ability of local SWP contractors to more fully utilize their allocation of imported SWP water by storing available but unused allocations in the Antelope Valley Groundwater Aquifer. The primary purpose of the UAP is to recharge the Antelope Valley Groundwater Basin using surface water supplies originating from SWP water (via the California Aqueduct) and excess stormwater runoff from Armargosa Creek. The project would enable the storage of imported SWP water during the winter and spring when the demand and environmental impacts in the Bay-Delta region are lower, and when water is available within the user's allocation. In addition, excess stormwater flows in Amargosa Creek that currently go unused would also be diverted for recharge. The recharged water would be extracted at a later date and used to satisfy peak summertime demand that exceeds the region's current ability to divert imported water during that period and also to improve overall water supply reliability in dry years by storing water in the aquifer.

The secondary purpose of the Project is to provide a community native habitat conservation area and nature park that incorporates habitat enhancement and restoration, visitor-serving amenities, and educational and interpretive displays on local biological and water resources.

Project Objectives

CEQA requires that an EIR state the objectives of a proposed project to explain the reasons for project development and why this particular solution is being recommended. The project objectives are instrumental in determining the alternatives considered in the EIR.

The primary project objective is to provide a facility, to be constructed on a site owned by the City of Palmdale, that provides for groundwater recharge of surface water supplies originating from the California Aqueduct and Armargosa Creek Watershed. Other objectives include the following:

- Maximize the potential for groundwater recharge;
- Preserve and enhance existing native habitat;
- Preserve natural open space on steeper terrain/hillside areas;
- Provide for passive recreational uses for the general public including multi-use bike paths and interpretive displays, while minimizing effects of public access on the environment;
- Minimize adverse impacts to environmental resources;
- Provide harmony between the project and adjacent land uses;
- Adhere to local, state, and federal environmental regulations; and
- Adhere to local building code and zoning regulations.

Scope of EIR

The City of Palmdale prepared an Initial Study (IS) to identify potentially significant impacts resulting from the UAP Project implementation. The completed IS was circulated as part of the Notice of Preparation (NOP) of this EIR. This EIR discusses those environmental resource areas identified in the NOP/ IS as having the potential to be significantly impacted by the proposed project as well as those considered to be adverse, but less than significant, as required under CEQA Guidelines Section 15126. These resource areas include:

- Air Quality
- Biological Resources
- Hydrology
- Land Use

- Cultural Resources
- Geology
- Hazards
- Noise
- Transportation
- Other Resources (Public Recreation and Utilities and Service Systems)

Project Overview

The City of Palmdale proposes to develop the Upper Amargosa Project (UAP) on approximately 87 acres located within the City limits (Figures 2-1 and 2-2). The UAP would include the following components:

1) Approximately 20-acre recharge facility, including recharge basins and infrastructure;
2) a 38-acre community nature park containing multi-use pathways, picnic tables, interpretive plaques, and habitat enhancement/restoration areas;
3) a 22-acre native habitat conservation area; and
4) 7 acres of open stream channel.

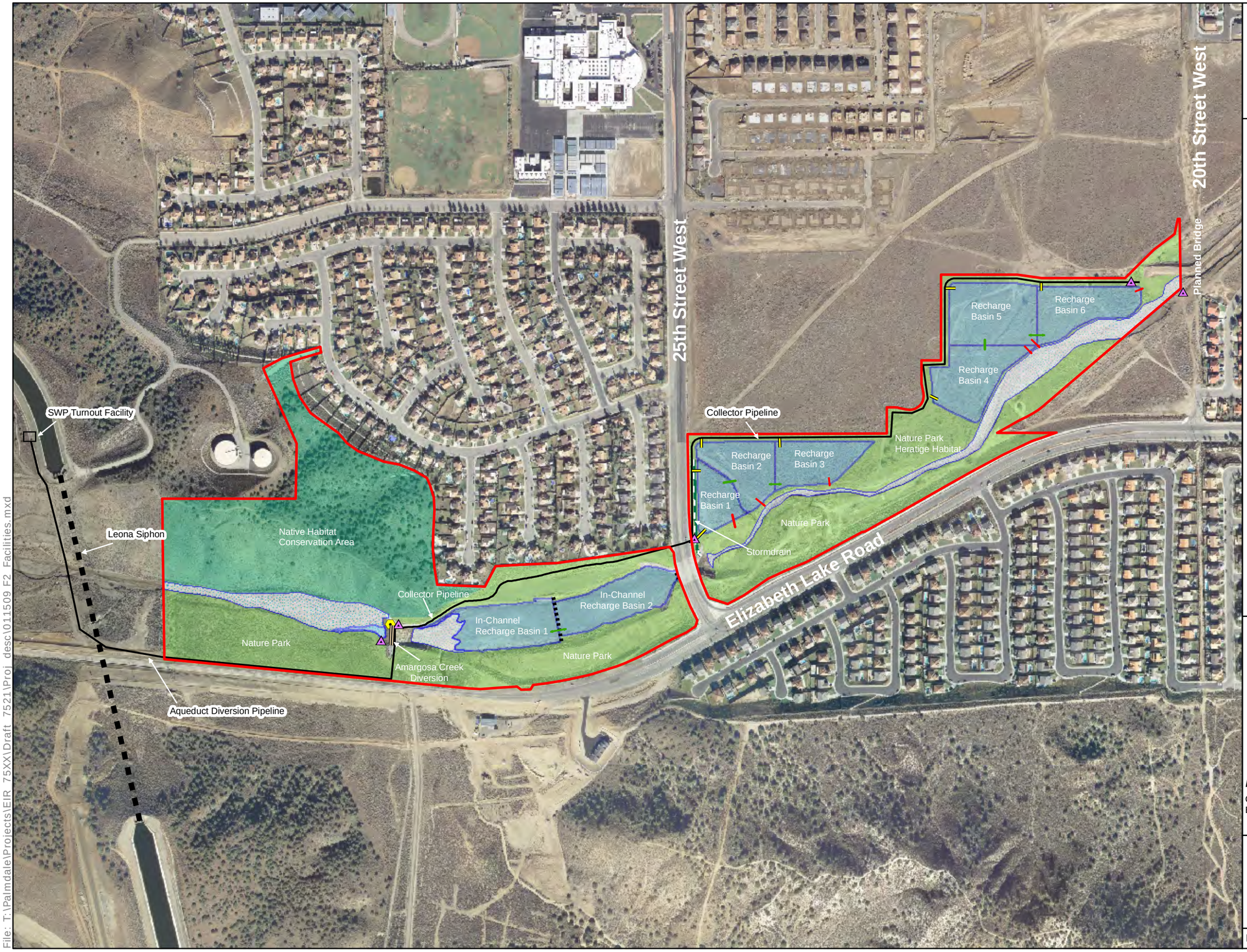
The purpose of this recharge facility would be to provide increased groundwater recharge to the Antelope Valley Groundwater Basin. The recharge facility would receive water from two sources, the State Water Project (SWP) and the Amargosa Creek watershed. The recharge facility would consist of two in-channel basins and six off-channel basins designed to retain water and allow it to infiltrate into the ground. Maximum recharge estimates, based on a full year operation schedule, range from approximately 22,000 acre feet per year (AFY) to 80,000 AFY, and would average 36,500 AFY. Based on the proposed operation schedule where recharge basins would be out of operation during summer months when water may not be available, the recharge facilities would recharge between 14,500 AFY to 53,000 AFY, and would average approximately 24,300 AFY. The total combined (SWP water and Amargosa Creek stormwater runoff) annual average available water for the UAP would be approximately 25,400 AFY.

In conjunction with the recharge facility, a community nature park would be created within the boundaries of the project site. The nature park would provide recreational and educational opportunities, including 2.5 miles of multi-use pathways through the nature park and around the proposed recharge basins. The pathways would facilitate the community's continued use of the area and link to existing trails and bike pathways within the City (see Figure ES-1). Passive recreational amenities (i.e., ramadas and picnic tables) would be placed within the park. The nature park would include the enhancement and restoration of previously disturbed habitat to remove non-native vegetation and restore native Mojave Desert scrub, riparian vegetation, and wildlife habitat. Educational displays and interpretive plaques would be located throughout the nature park to provide information on local biological and water resources (i.e., desert environment, native plants and animals, watershed processes, urban runoff, and the recharge facilities).

The UAP is located in the southern region of Antelope Valley within the City of Palmdale in Los Angeles County, California (Figure 2-1). The project site consists of four undeveloped parcels, adjacent to Amargosa Creek and north of Elizabeth Lake Road, and extends approximately 3,000 feet from the planned 20th Street West Bridge to the existing 25th Street West Bridge, and approximately 2,700 feet west to near the Leona Siphon of the California Aqueduct (Figure 2-2). Currently, the City owns all but one 17.3 acre parcel located on the eastern portion of the project site. The city is currently in negotiations for purchase of this parcel.

Upper Amargosa Project

- Groundwater Recharge Facilities -



- Project Boundary (87 acres)
- Recharge Basin (20 acres)
- Nature Park (38 acres)
- Native Hab. Conserv. (22 acres)
- Open Stream Channel (7 acres)
- Push-Up Dam
- Conveyance Pipe
- Storm Drain with Outlet Structure
- Basin Inlet Pipe/Valve with Flow Measurement
- Interpond Pipe/Gate/Weir with Flow Measurement
- Return Flow Pipe/Gate/Weir with Outlet Protection/Flow Measurement
- Stream Diversion Intake Structure/Headgate
- Flow Measurement Device

0 250 500 750 1,000

Feet

NOTES:

Coord Sys: State Plane NAD 83 Zone 5 U.S. Foot
Basemap: LARIAC 4-in resolution Airphoto, 2006

SAIC From Science to Solutions

FIGURE: ES-1

DATE: 01/15/09 | BY: A. Pappas

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Alternatives

The four alternatives selected for detailed analysis in the EIR include:

1. No In-Channel Recharge Basins;
2. Reduced Off-Channel Recharge Basins;
3. Alternative Aqueduct Pipeline Routes; and
4. No Project Alternative.

These alternatives involve variations to the following project components:

- Recharge Structures
  - In-Channel Recharge Basins
  - Off-Channel Recharge Basins
- Nature Park/Habitat Conservation
- Open Stream Channel
- Pipeline Alignments

Alternative 1: No In-Channel Recharge Basins

Alternative 1 would alter the number of recharge basins. Under this alternative, construction of the in-channel recharge basins would not occur (Figure 2-6). However, the Amargosa Creek Diversion would remain to direct a portion of stormwater flows to the off-channel recharge basins. Alternative 1 would reduce impact to the Amargosa Creek stream channel and hydrologic regime of the Amargosa Creek watershed by eliminating the construction of the in-channel earthen dams. This alternative would not alter the size of the nature park or pipeline lengths/alignments.

Alternative 2: Reduced Off-Channel Recharge Basins

Alternative 2 would reduce the number of proposed off-channel recharge basins from six to three (Figure 2-7) and restore the unused areas as native habitat. Alternative 2 would include construction of the two in-channel recharge basins and the Amargosa Creek Diversion structures. This alternative would not alter the Aqueduct Diversion Pipeline but would reduce the length and disturbance associated with the Collector Pipeline.

Alternative 3: Alternative Aqueduct Diversion Pipeline Alignments

Alternative 3 would include alternative locations for the Aqueduct Diversion Pipeline. This alternative differs from the original project in that it changes the alignment of the Aqueduct Diversion Pipeline. All other aspects of the project remain as described in the proposed project. This alternative considers two different pipeline alignments; Alignment "A" located on the north side of Amargosa Creek; and Alignment "B" buried in the Amargosa Creek stream channel (Figure 2-8).

Alternative 4: No Project Alternative

As directed under CEQA Guidelines Section 15126.6, the No Project Alternative assumes the reasonable future development of the project site assuming the proposed application were not approved, given

currently available public services infrastructure. The current site is zoned single family residential. Barring a change in that zoning, the site could be developed as residential with a minimum 7,000 square foot lot size.

There are constrains as to the number of residential units that could be constructed. Homes could not be constructed in the stream channel or the flood plain immediately adjacent to the channel. Approximately 50 acres of the 87 acre site are reasonably level, above the flood plain, and therefore assumed to be potentially suitable for residential housing. Assuming ten percent of the 50 acres would be allocated to streets, a maximum of 280 units could be built on potentially buildable lots within the site boundary. Streets and electric power, gas, sewer service, and water would need to be installed so support the development. Approximately 50 acres of grading would be required and trenching for utilities and services would also need to occur.

Impacts and Mitigation Measures

This EIR discusses all environmental resources potentially impacted by the project as required by CEQA. The City issued a Notice of Preparation/Initial Study (NOP/IS) for the UAP on September 11, 2008. The NOP/IS described the Project and the environmental review process and identified the environmental issues to be addressed in the EIR. Impacts on the following environmental issue areas were determined by the City of Palmdale in the Initial Study as warranting detailed evaluation in this EIR:

- Aesthetics/Visual Resources;
- Air Quality;
- Biological Resources;
- Cultural Resources;
- Geology and Soils;
- Hazards and Hazardous Materials;
- Hydrology and Water Quality;
- Land Use;
- Noise;
- Transportation/Circulation; and
- Other Resource Areas:
    - Public services;
    - Recreation; and
    - Utilities/service systems.

The following sections summarize the impact analyses as they relate to potentially significant impacts. Impacts that were considered less than significant and for which no mitigation measures would be required are not addressed in this Executive Summary. These less than significant impacts are addressed in the relevant issue area discussion. Refer to Table ES-2 at the end of this section for a summary of the significant impacts associated with the proposed project and mitigation measures that would minimize those impacts.

Aesthetics/Visual Resources

The assessment of aesthetic impacts involves qualitative analysis that is inherently subjective in nature. This assessment of visual resources is based on evaluation of the physical attributes of the project site, its relative visibility, and its relative uniqueness. The potential impact for a project to affect on-site and surrounding visual character and qualities is based on the assessment of the visual character of project features compared to the project setting. This evaluation compares the existing visual characteristics of the project study area against the potential changes in visual characteristics that could result from implementation of the proposed project.

The proposed project would involve minor modifications to the landscape of the project site. There would be no highly visible structures. Several ramadas and interpretive signs would be installed and the berms for the recharge basins would be visible from certain locations. There would be limited solar lighting. In general, the character of the area would not be modified substantially and the visual effects would be less than significant.

Air Quality

Air pollutant emissions from the proposed construction and operations were calculated using the most current emission factors and methods, then compared to the thresholds identified in Section 3.2.2.1 to determine their significance. For impacts that exceed a significance criterion, mitigation measures were applied to project activities to determine their ability to reduce impacts to insignificance.

Project construction activities would require the use of off-road construction equipment and on-road trucks. These emission sources would primarily use diesel fuel, resulting in combustive emissions in the form of VOC, CO, NOx, SOx, and PM. In addition, equipment and vehicles traveling over unpaved surfaces and performing activities such as grading or earthmoving would generate fugitive dust emissions in the form of PM.

To estimate peak daily construction emissions for comparison to the AVAQMD significance thresholds, daily emissions for each construction activity were calculated for the duration of their proposed calendar schedule. Peak daily emissions were then determined by identifying the maximum daily emissions that would occur from overlapping construction activities during the entire construction calendar schedule. The analysis also compared peak annual construction emissions to the AVAQMD annual emission thresholds as a conservative approach to determine the significance of project construction emissions.

Project operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The emissions associated with the project operational activities are minimal. Therefore, it was not necessary to perform a quantification of project operational emissions.

With the exception of greenhouse gases (GHG), air quality impacts are less than significant. This is because the limited construction period is the only time when substantial pollutant emissions would occur from the project. Emissions of criteria pollutants during construction would remain below the AVAQMD significance thresholds. In the case of GHG, there is currently little guidance and no local, regional, state, or federal regulation that establishes a threshold to determine the significance of how proposed GHG emissions impact climate change.

- Therefore, the proposed project utilizes the following as its threshold of significance:
- The proposed project would result in a significant impact if GHG emissions exceed baseline emissions.

- In absence of further guidance, this threshold is the most conservative, as any increase over the baseline would be designated as significant.

Therefore, GHG emissions are considered significant and unavoidable. There are no currently available technologies capable of eliminating GHG emissions entirely from construction equipment.

Biological Resources

Vegetation mapping and surveys for special status biological resources were conducted at the project site. These surveys established the baseline conditions against which the impacts of the proposed project on biological resources are analyzed. The vegetation at the project site was mapped on a 2006 aerial photograph using visual interpretation of vegetation categories on the photograph coupled with site visits on March 12, April 16, April 17, and May 12, 2008. Vegetation categories were adapted from Holland (1986). Several land cover types identified for this project site are not described in Holland. Wildlife species at the project site was surveyed during SAIC site visits site visits on March 12, April 16, April 17, and May 12, 2008. A complete list of wildlife species observed during SAIC site surveys is included in Appendix B-1). Small mammal trapping surveys were also conducted on April 16 and April 17, 2008 to ascertain the general small mammal populations. Details of these surveys are provided in Appendix B-2.

Consistent with guidance provided in CEQA Guidelines *Appendix G* Environmental Checklist Form, the proposed project would have a significant impact on biological resources if it would result in one or more of the following conditions:

BIO-1: Have a substantial direct or indirect effect on plant or wildlife species identified for special status under local, state, tribal, or federal laws, regulations, or policies;

BIO-2: Have a substantial adverse effect on any natural vegetation community identified for special status under local, state, tribal, or federal laws, regulations, or policies, including wetlands;

BIO-3: Have a substantial adverse effect on native resident or migratory wildlife movement corridors, breeding or spawning habitats, and nursery habitats;

BIO-4: Cause a substantial disruption of local biological communities (e.g., from construction impacts or the introduction of noise, light, or invasive species); or

BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

BIO-6: Conflict with provisions of an approved local, state, tribal, or federal habitat or species conservation plan.

While potentially significant impacts were identified for many of the above criteria, mitigation measures are available to reduce the impacts to less than significant levels. The reader is referred to Table ES-2 for a summary of the impacts and mitigation measures related to Biological Resources.

Cultural Resources

Impacts on cultural resources were evaluated by determining whether ground-disturbance activities associated with construction or operations of the proposed project would affect areas that contain or could contain archaeological or historical sites or historic structures listed in or eligible for listing in the NRHP, the CRHR, or would otherwise be considered a unique or important archaeological or paleontological resource. The project would involve ground-disturbing activities associated with the construction and operation of the recharge basins. These are not expected, but have the potential, to result in impacts to resources listed in or eligible for listing in the NRHP, the CRHR, or otherwise considered a unique or

important archaeological resource under CEQA and/or to result in the permanent loss of, or loss of access to a paleontological resource of regional or statewide significance. As such, the project has a slight potential to result in significant impacts on cultural resources. However, implementation of the recommended mitigation measures would eliminate the potential for impacts to cultural resources associated with construction and operation of the in-channel basins as compared to the proposed project. See Table ES-2 for a summary of Mitigation Measures CR-1.1 through 1.3 and Mitigation Measure CR-2.1 that would reduce potentially significant impacts to a less than significant level.

Geology and Soils

Geological impacts were evaluated in two ways; (1) impacts of the project on the local geologic environment; and (2) impacts of geohazards on project components that may result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

In addition, the assessment of impacts is based on the following regulatory controls that would govern various project components and are the basis for state permits that would be required prior to construction:

- An individual NPDES permit would be prepared for stormwater discharges under the General Construction Activity Stormwater Permit, in order to contain construction- and operations-induced stormwater runoff. A SWPPP would be completed in associated with the NPDES permit.
- Project components would be designed and constructed in accordance with City of Palmdale Building and Safety Department requirements, to minimize impacts associated with seismically induced geohazards. Such construction would include, but not be limited to, completion of site-specific geotechnical investigations regarding construction and structural engineering. Measures pertaining to temporary construction conditions would be incorporated into the design. A licensed geologist or engineer would monitor construction to verify that construction occurs in concurrence with Project design.

All potential impacts to geology and soils were considered less than significant with the exception of the potential for liquefaction. The UAP could increase the likelihood of liquefaction in two ways. The first would be from the immediate wetting of the soils due to recharge operations and the second would be from groundwater mounding, resulting in depth to groundwater of less than 40 feet in areas of no existing liquefaction potential. The 25th Street Bridge, proposed 20th Street Bridge, and nearby residential developments (see Figure 2-2) could be impacted by the increased likelihood of liquefaction, due to their proximity to the proposed UAP site. The 25th Street Bridge traverses the middle of the proposed UAP site and the proposed 20th Street Bridge would traverse the eastern boundary of the project site. By installing monitoring wells at the project location to measure the depth to groundwater, the impacts of liquefaction can be mitigated by ensuring that water levels are not permitted to reach a level of 40 feet or less below ground surface. The residual impact would be less than significant.

Hazards and Hazardous Materials

The term hazardous materials is defined in different ways for different regulatory programs. This EIR uses the definition in California Health and Safety Code Section 25501(o) that defines hazardous materials as:

> *Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous wastes, and any material which a handler or the*

administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Hazards and hazardous materials impacts have been evaluated primarily with respect to the potential for spills during construction and operations. The assessment of impacts is based on the assumption that coverage under an individual NPDES/WDR permit for project operations and a NPDES Construction Activity Storm Water General Permit for construction activities. A Storm Water Pollution Prevention Plan (SWPPP) would be completed in association with each of these permits.

Hazardous substances and petroleum products would potentially be spilled or exposed during project construction and operations, resulting in health and safety impacts to on-site personnel and/or the environment. However, implementation of standard BMPs, proper transportation, use, storage, and disposal of hazardous materials and petroleum products, in accordance with applicable federal, state, and local regulations would result in less than significant impacts related to hazards and hazardous materials.

The proposed project would result in ground disturbing activities during construction including grading and development of the Nature Park, retention basins, and pipelines and during operation and maintenance activities. Contaminated soils and/or groundwater are not expected to be found at the site during construction and/or operational activities. However, workers could encounter previously unknown contaminated soils in which case impacts could include potential localized spread of contaminants as well as expose workers and off-site receptors to health and safety risks. In the event that contaminated soils are discovered during construction and/or operations, standard regulations are in place that requires reporting and cleanup of any contamination found. As such, the proposed project would result in less than significant impacts related to hazards to the public or the environment through the presence of soil or groundwater contamination.

Hydrology and Water Quality

The focus of the hydrology and water quality impact analysis is to assess the effect of the project on the surface water resources associated with Amargosa Creek and the groundwater resources in the Antelope Valley in the vicinity of the proposed project. Since the intent of the project is to capture surface waters and facilitate recharging the local groundwater aquifer, these two water resource areas are closely related. The analysis evaluates the potential water quality effects including the effect of diverting water from Amargosa Creek for recharge on water quality in Amargosa Creek, and the effect of recharging SWP and Amargosa Creek water to the local area of the Antelope Valley Aquifer. The analysis also assesses the potential of the project to affect water supplies, including surface water or groundwater hydrology and the implications thereof. For example, access to water downstream could theoretically be adversely affected by upstream diversions.

The CEQA Guidelines Appendix G Environmental Checklist Form defines significance criteria for water quality. Because groundwater and surface water are interrelated by the recharge component of the proposed project, the Appendix G criteria are modified here to more directly reflect the specific situation of this project. Therefore, the proposed project would have a significant effect on water resources if it would result in one or more of the following:

WR-1: Cause a substantial adverse change in surface water or groundwater availability.

WR-2: Cause a substantial adverse change in surface water or groundwater quality.

WR-3: Substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

In most respects, the project would not result in significant adverse environmental effects related to hydrology and water quality. However, during construction and operation, equipment would need to be operated in the creek channel to construct some facilities or to reconstruct in-channel berms that are washed out by high stream flows. In both cases, equipment or partially constructed facilities in the creek channel could result in significant adverse effects if left in place during a heavy rainfall event. This can readily be mitigated to less than significant levels by ensuring that equipment or partially constructed facilities are not left in the creek when a significant storm event is eminent. The project is designed and would be operated to permit sufficient downstream flow for existing beneficial uses, including habitat values and groundwater recharge. Nevertheless, to ensure that operations do not adversely affect downstream users, steamflows would be required to be monitored during operations to ensure that adequate flows are maintained for downstream uses, thereby avoiding significant adverse effects on surface water quality and availability. See Table ES-2 for a description of impacts and mitigation measures.

The proposed project is designed to increase recharge to the Antelope Valley Groundwater Basin, a substantial beneficial impact. Mitigation measures would ensure that the beneficial groundwater recharge effects of the project are not counterbalanced by significant adverse surface water quality or availability impacts downstream of the project.

Land Use

The land use analysis evaluates consistency or compliance of the proposed project with adopted plans and policies governing land use development on the project site, including the City of Palmdale General Plan and its Elements, the Zoning Ordinance, and other applicable plans. The land use analysis also evaluates the potential for the proposed project to introduce incompatible land uses relative to existing surrounding land uses or activities. This analysis includes an evaluation of the extent to which off-site land uses would be affected by project-related physical interruption or disruption, or the extent to which other project-related environmental impacts would constitute land use impacts.

There are no significant adverse land use-related impacts associated with the project.

Noise

Determining the significance of noise impacts resulting from the proposed action and alternatives involved four main tasks: (1) Sensitive receptor sites were selected to characterize public and other noise sensitive uses in the study area; (2) Assumptions concerning the existing baseline noise levels at the selected receptor sites were made; (3) Noise data from a selection of the proposed construction equipment that could be operating simultaneously was assembled and extrapolated from published sources and used to estimate the demolition/construction noise impact.

Analyses were conducted of three likely sensitive receptor locations. The location closest to all project construction activity (Site A) was considered most vulnerable to noise impacts by virtue of being much closer to both pipeline and recharge basin construction locations. Existing sound walls on the property boundary between the project site and these residential lots would attenuate equipment noise by approximately 10 dB. (A 10 dBA reduction requires reducing the acoustic energy by 90 percent. and is considered attainable with the existing sound wall. Higher reductions are very difficult to achieve [FHWA 1995]). The estimated noise impact level would therefore be 65 dBA when the pipeline construction was

nearest the houses, which would only occur for a limited period of less than one week. While this level equals the threshold criterion, it does not exceed it and would only occur over a very limited period of project construction. The impact is considered less than significant. Nevertheless, mitigation measures are recommended to ensure that the noise levels from construction would be minimized. These are summarized in Table ES-2.

Transportation/Circulation

Impacts on transportation and circulation that would result from the proposed project were identified by comparing existing service capacity and facilities against anticipated future demand associated with construction and operation of the proposed project. Due to the very minor traffic associated with the project, no significant impacts were associated with the project.

Other Resource Issues

Public Services

The proposed project would not involve an additional demand for public services (police, fire protection, and medical care facilities). The project does not include construction of housing or facilities that would generate additional requirements for police or fire protection. The limited infrastructure proposed would be small and isolated from nearby structures (i.e. picnic ramadas) such that a fire within the UAP would be very unlikely and, if one were to be started, would also be unlikely to spread to adjacent structures. The amount of visitor traffic expected to be generated by the nature park is approximately 20 out-of-area visitors per day. The proposed project would therefore not result in significant impacts to police, fire protection, or public roadways.

Public Recreation

The UAP includes a community nature park as a key component. The park would consist of 38 acres of native and restored habitat with interpretive displays; information signage relating to native plants and wildlife; a Heritage Habitat area consisting of existing native trees, shrubs, and restored and natural ground cover; hiking and biking trails; and armadas with picnic tables for public use. The project would therefore add a recreation facility to the local park and recreation system that does not currently exist. As a consequence, the proposed project would have a beneficial impact to public recreation. Utilities and Service Systems

Utilities and Service Systems

The UAP involves a minimum of utility service requirements. The SWP diversion Turnout at the California Aqueduct will involve electric pumps to extract water from the aqueduct and divert it by pipeline to the project's diversion point and into the Collector Pipeline for delivery to the off-channel recharge basins. Minimal electricity would be required to operate the pumps since the lift is minimal and the downgradient pipe will act as a siphon once water begins to flow. Therefore, direct electricity use by the project will be minimal. The project is proposed to be lighted by solar powered lights so that utility runs do not need to be installed throughout the project site. Solar lighting would not draw on the electricity grid and would therefore have no impact on electric utilities.

Irrigation of the native restoration areas would occur during initial vegetation establishment. Irrigation water would be supplied by existing municipal water supplies. The amounts required would be minimal and would diminish as the native species become established. Therefore, project demand for water would be in limited amounts and for a limited duration.

There is the potential for some concern on the part of the public regarding the effects that recharging water from Amargosa Creek or the SWP would have on the quality of water subsequently withdrawn from the aquifer for human consumption. Section 3.7.2.3.2 addresses this issue and concludes that the impact would be less than significant. This based on the fact that water from both Amargosa Creek during runoff events and from the SWP has similar or lower concentrations of contaminants compared to the Antelope Valley Groundwater Basin. In addition, the recharged water would be mixed into the aquifer before withdrawal and withdrawn water would be treated to legally mandated drinking water standards prior to delivery to customers. Therefore, the impact of the proposed project on the quality of drinking water would be less than significant.

Cumulative Impacts

The CEQA Guidelines (14 CCR 15130) require a reasonable analysis of the significant cumulative impacts of a proposed project. A cumulative impact is defined by CEQA as "*two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts*" (CEQA Guidelines, Section 15355).

According to Section 15130 of the CEQA Guidelines, cumulative impacts shall be discussed when the project's incremental effect is cumulatively considerable. The discussion of cumulative impacts needs to reflect the severity of the impacts and the likelihood of occurrence, but the discussion does not need to go into as great detail as is provided for the effects attributable to the project alone. According to the Guidelines, the following elements are necessary for an adequate discussion of significant cumulative impacts:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or
- A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document that has been adopted or certified, which described or evaluated regional or area-wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the Lead Agency; and
- A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available, and a reasonable analysis of the cumulative impacts of the relevant projects. The EIR shall examine reasonable options for mitigating or avoiding any significant cumulative effects of a proposed project.

Therefore, the following cumulative impact analysis focuses on whether the impacts of the proposed project are cumulatively considerable within the context of impacts attributable to other past, present, or future projects.

Cumulative Visual Impacts

Short-term impacts resulting from construction activities (i.e., clearing, grubbing, grading, and excavation) would temporarily alter the visual character of the project site and its surroundings. The project would not introduce new sources of light and glare; construction would occur during daylight hours and for a limited duration; and project operations would result in a minimal change in the level of night light illumination when compared to what is presently generated over the project site. As the proposed project would not substantially alter any scenic vistas, degrade the existing visual character, or produce substantial light or glare, the project's contribution to cumulative effects would be a less than cumulatively considerable.

Cumulative Air Quality Impacts

Emissions of O_3 precursors and PM_{10} and $PM_{2.5}$ from the proposed construction activities, in combination with emissions from future sources and approved projects in the region, would exacerbate the existing O_3, PM_{10} and $PM_{2.5}$ nonattainment conditions within the Antelope Valley. Emissions from operation of the project would not exceed the construction annual or daily thresholds. Construction equipment and schedules would be required to implement standard AVAQMD dust control measures and construction emissions are included in the region's air attainment planning process. As a result, the projects contribution from proposed construction activities would be less than cumulatively considerable.

Emissions of O_3 precursors and PM_{10} and $PM_{2.5}$ due to operation of the proposed project, in combination with emissions from future sources and approved projects in the region, would exacerbate the existing ozone nonattainment status within the Antelope Valley. However, emissions from operation of the project would not exceed the operational annual or daily thresholds. As a result, operation of the project would contribute less than cumulatively considerable air quality impacts.

Cumulative Biological Resource Impacts

The proposed project would have significant impacts to special status species (**Impact BIO-1**), special status vegetation communities (**Impact BIO-2**), migratory/breeding birds (**Impact BIO-3**), local biological communities through introduction of invasive species (**Impact BIO-4b**), and native desert vegetation including California juniper and Joshua trees protected by local ordinance (**Impact BIO-5**). The project's nature park and revegetation elements would also improve existing native habitat compared to existing conditions. Prior to mitigation, these impacts could contribute substantially to cumulative effects of past, present, and future projects. With implementation of the mitigation measures described in Section 3.3, residual impacts of the proposed project would be less than significant, and the project's contribution to cumulative effects would be less than cumulatively considerable.

Cumulative Cultural Resource Impacts

Ground disturbing activities associated with the proposed project are unlikely, but have the potential to result in significant adverse effects. Therefore, prior to mitigation the proposed project, together with other reasonably foreseeable projects identified in Table 4-1, could have a cumulatively significant impact on cultural resources. However, implementation of mitigation measures listed in Section 4.3 would minimize the project's potential for disturbing cultural resources. Therefore, the project's contribution to cumulative effects would be less than cumulatively considerable.

Cumulative Geology and Soils Impacts

The proposed Project has the potential, due to the groundwater recharge activities, to raise groundwater levels. Liquefaction (when saturated soils lose cohesion and behave like a liquid during an earthquake) could potentially occur in areas where the groundwater level was allowed to reach within 40 feet of the surface. The current groundwater level is at approximately 350 feet, so the immediate risk is very low. However, the potential impact can be mitigated to less than significant levels by installing and monitoring one or more wells downgradient of the project recharge basins and ensuring that groundwater levels do not approach the surface by less than 40 feet. With this mitigation, the project's contribution to cumulative geology and soils impacts would be less than cumulatively considerable.

Cumulative Hazards and Hazardous Materials Impacts

Compliance with applicable federal, state, and local regulations during project construction and operation would ensure that the use and storage of hazardous materials would be undertaken in a safe and prudent manner. In addition, operation of the proposed project would have little potential for the transportation, use, or disposal of hazardous materials and would not create a significant hazard to the public or environment through the presence of soil or groundwater contamination. As such, the project's contribution to cumulative effects on public health related to public exposure to hazardous materials would result in a less than cumulatively considerable impact.

Cumulative Hydrology and Water Quality Impacts

The proposed Project would have less than significant impacts on water quality and quantity with implementation of mitigation to ensure that construction equipment is not used in the creek bed when it could be caught in floodwaters during a sudden rainstorm. The contribution of the UAP to cumulative water quality and availability impacts would be less than cumulatively considerable.

Operation of the UAP would provide additional groundwater to the Antelope Valley Groundwater Basin that could subsequently be withdrawn to provide for future demand for water. Therefore, the proposed Project would not cause any additional reduction in either the quality or availability of water. Indeed, the UAP would enhance availability and potentially may future residential development possible without cumulatively significant impacts. The water quality and availability impacts of the proposed Project would be largely beneficial and would not be cumulatively considerable.

Cumulative Land Use Impacts

The proposed project would not result in incompatibility with existing land use or disrupt or divide established communities. Implementation of resource-specific mitigation measures would ensure project compliance with plans and policies in the City of Palmdale General Plan. Project residual impacts on land use would, therefore, be less than significant and would result in a less than cumulatively considerable impact.

Cumulative Noise Impacts

Noise from construction activities would contribute to cumulative effects to past, present, and future projects during construction. Routine operational maintenance activities would generate sporadic, short-term sources of noise. Short-term sources of noise generated by routine maintenance activities would not result in a substantial contribution to ambient noise levels because these sources would be infrequent. Proposed project operations would not generate substantial traffic trips along adjacent roadways, and roadway noise would not increase substantially. The proposed project's incremental short-term construction noise impacts would be less than significant but could contribute to cumulative effects of past, present, and future projects. However, with implementation of the mitigation measures described in Section 3.9, impacts of the proposed project would be reduced to a less than significant level during construction. Therefore, the project's contribution to cumulative noise impacts during construction would be less than cumulatively considerable and of short duration. Operation of the UAP would not result in a cumulatively considerable contribution to cumulative noise.

Cumulative Transportation and Circulation Impacts

The proposed Project would involve minimal traffic during construction and a very small amount of traffic during operations. The contribution of the proposed Project to cumulative transportation and circulation impacts would be less than cumulatively considerable.

Cumulative Other Resource Impacts

The proposed project will make minimal demands on Public Services, Public Recreation, and Utility and Service Systems. The UAP will, in fact, increase the ability of local water purveyors to provide for future growth. The contribution of the proposed project to cumulative Public Services, Public Recreation, and Utility and Service Systems impacts is considered less than cumulative considerable and, in the area of water supply, it would be beneficial.

Comparison of Alternatives

CEQA Alternatives Comparison

Table ES-1 compares the relative impacts of the alternatives to the proposed project indicating whether the impact associated with the alternative is much less than, less than, or approximately the same as the impact associated with the proposed project.

Table ES-1. Comparison of Estimated Impact Magnitude by Alternative

Environmental Resource Area	*Proposed project*	*Alternative 1 No In-channel Basins*	*Alternative 2 Reduced Off-channel Basins*	*Alternative 3 Alt Pipeline Routes*	*No Project Alternative*
Aesthetics and Visual Resources	LTS	≈	≈	≈	>
Air Quality (construction)	US	≈	≈	≈	>
Biological Resources	LTS w/M	<	<	≈	>
Cultural Resources	LTS w/M	≈	≈	≈	≈
Geology and Soils	LTS	≈	≈	≈	≈
Hazards and Hazardous Materials	LTS	≈	≈	≈	≈
Hydrology and Water Quality	LTS w/M	<	≈	≈	>
Land Use	LTS	≈	≈	≈	≈
Noise	US	≈	≈	≈	>
Transportation and Circulation	LTS	≈	≈	≈	>
Other Issues Areas	LTS	≈	≈	≈	>

Notes:
> = Greater than
< = Less than
≈ = Approximately the same

Environmentally Preferred Alternative

The proposed project and all alternatives would result in unavoidable significant impacts to air quality (GHG gas emissions during construction or operation). The No Project Alternative would result in unavoidable significant impacts on aesthetics and visual resources with construction of housing on the project site; air quality (GHG), and biological resources (loss of habitat). For all other issue areas and alternatives, the impacts are less than significant, either without the need for mitigation or with the application of appropriate mitigation measures.

The No Project Alternative involves not proceeding with the proposed project. However, given that the site is currently zoned residential, if this designation is not changed, portions of the site could be developed for housing. Constructing housing would involve extensive grading and the conversion of degraded and natural habitat to residential use. Therefore, it is likely that housing would result in the removal of existing natural habitat. There would also be no restoration of native habitat and there would be extensive visual alteration of the site from its present condition. In addition, the No Project Alternative would result in a substantial change in the visual character of the site, greater air pollutant emissions, more noise, more traffic, and most likely less recreational open space than the proposed project. Therefore, the No Project Alternative would not be the Environmentally Superior Alternative. It would involve greater alteration of the natural environment than the proposed project.

Among the other alternatives to the proposed project evaluated in this EIR, Alternative 1 (No In-Channel Recharge Basins) would have the lowest overall environmental impact by virtue of not constructing the in-stream recharge basins. Not having in-channel basins results in somewhat lower overall impacts to biological resources and hydrology and water quality than the proposed project by minimizing disturbance in the creek channel as well as the opportunities during construction and operation for hazardous materials releases or diversion of stream flows from equipment working in the creek bed. These impacts can be mitigated to less than significant levels, but their risk of occurrence would be eliminated by not having in-stream recharge basins.

Impact Summary

Table ES-2 provides a summary of all potentially significant environmental impacts and their associated mitigation measures. Column 1 describes the impact. Column 2 describes the mitigation measure in detail. And column 3 indicates whether the mitigation was sufficient to reduce impacts to less than significant levels.

Table ES-2. Impact Summary Table

Impact	*Mitigation Measure*	*Residual Impact*
Air Quality		
Project operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The GHG emissions associated with the project operational activities are minimal. Therefore, it is not necessary to perform a quantification of project operational GHG emissions. However, the annual CO2e emissions from the proposed project operational activities would still increase relative to the CEQA Baseline levels. These increases in GHG emissions are considered to be a significant impact.	While significant GHG emission would be associated with the proposed project and its alternatives by virtue of a zero threshold for GHG emissions, there are no feasible mitigation measures to reduce GHG emissions sufficiently that the project would not result in some increase in GHGs. There being no measures to monitor, no mitigation monitoring program for Air Quality related impacts is proposed.	Unavoidable significant
Biological Resources		
Impact BIO-1: The proposed project could potentially result in the loss of individuals or habitat of special status plants and wildlife.	**BIO-1:** A Biological Resources Protection Plan shall be prepared and implemented to minimize or avoid impacts to special status wildlife species during project construction. Habitat and species protection measures shall include, at a minimum: 1. Prior to site grading, a presence/absence focused survey for sensitive species, including coast horned lizards and the burrowing owl (*Athene cunicularia*) shall be conducted on the project site by a qualified biologist under the direction of the City of Palmdale Planning Department. Individual horned lizards shall be removed from the construction area, prior to construction, and relocated to a portion of the site not scheduled for development. If the burrowing owl is determined to be present, protective measures shall be implemented to ensure compliance with the Migratory Bird Treaty Act and other relevant Fish and Game Code requirements. The protective measures may include closure of burrows used by wintering birds prior to construction and are to be developed by a qualified biologist; Prior to grading, the City of Palmdale shall consult with the CDFG concerning the suitability of the habitat for the Mohave ground squirrel. If the habitat is determined to be suitable and the Mohave ground squirrel(s) are assumed to be present on the project site, mitigation for the impact to Mohave ground squirrel shall be provided with concurrence from CDFG. As outlined in the City of Palmdale General Plan, Natural Resources Element (Palmdale Planning 1993), the City of Palmdale shall cooperate with the implementation of the West Mojave Coordinated Management Plan for protection of the Mohave ground squirrel (Policy ER2.2.1 in General Plan). Mitigation may be provided as outlined in the March 29, 2006, correspondence by the City committing to mitigation for impacts to the Amargosa Creek in conjunction with the Operational Law Letter proposed for the project *in lieu* of the Streambed Alteration Agreement; 2. A qualified biologist with the appropriate permits shall be present during construction in habitats that support special status species. Any special status species, including coast horned lizards or silvery legless lizards, encountered during vegetation clearing shall be removed from the construction area, prior to construction, and relocated to a portion of the site not scheduled for development; 3. The project engineer shall clearly delineate limits of construction and, with the input of the project biologist, may designate “sensitive resource zones” on the project maps and construction plans. Sensitive resource zones are defined as areas in which construction would be limited in space, time, or methods to minimize or avoid impacts to special status species or their habitat; 4. Heavy equipment and construction activities shall be restricted to the defined limits of construction. Construction vehicles and personnel shall use existing access roads. All worker parking shall be off-site or within designated on-site areas approved by the project engineer and project biologist.	

Table ES-2. Impact Summary Table

Impact	*Mitigation Measure*	*Residual Impact*
Biological Resources (continued)		
Impact BIO-2: The proposed project would affect natural vegetation communities identified for special status under local, state, tribal, or federal laws, regulations, or policies.	**BIO-2:** The Biological Resources Protection Plan identified in **BIO-1**, shall include the following measures to minimize or avoid impacts to Amargosa Creek and associated riparian and wetland habitat. 1. The project engineer shall clearly delineate limits of construction and, with the input of the project biologist, shall designate portions of the Amargosa Creek channel outside of the proposed in-channel diversion and recharge basins, as "sensitive resource zones" on the project maps and construction plans. The areas of great valley willow scrub and coastal and valley freshwater marsh habitats on site will be included in the mapping of sensitive resource zones. Sensitive resource zones are defined as areas in which construction would be limited in space, time, or methods to minimize or avoid impacts to creek channel, riparian, or wetland habitat. 2. All construction equipment shall be stored and fuelled in designated locations at least 100 feet (30.5 meters) away from Amargosa Creek and in areas approved by the project biologist. 3. The stream corridor and riparian and wetland habitat associated with culvert inflows shall be included in a project invasive species control program, specifically including eradication of existing tamarisk (an invasive non-native species) on site and maintaining the site free of tamarisk during project operations. 4. The project will obtain and comply with applicable permits, including the CDFG Stream Alteration Agreement.	Less than significant
Impact BIO-3: Construction activities could adversely affect wildlife migration or breeding habitat for migratory birds and wildlife.	**BIO-3:** The following shall be incorporated into the Biological Resources Protection Plan (**Mitigation Measure BIO-1**) to avoid or reduce impacts to migratory and resident breeding birds and to reduce effects on wildlife movement: 1. Vegetation removal and preliminary grading required for project construction shall be accomplished during the season when avian species are not nesting (i.e., between September 1 and February 15). This will avoid direct impacts on nesting species by removing the habitat when they are not present. Should additional vegetation removal be required during the potential nesting season, a qualified biologist shall be retained to conduct pre-construction nesting bird surveys during the nesting season in areas that would require the direct removal of native vegetation where suitable nesting habitat for resident or migratory bird species may occur. The surveys shall focus on breeding behavior and potential nesting locations in the proposed work area and immediately adjacent to that area. Based on the results of the surveys, recommended buffer areas between construction activities and observed nesting habitat, if present, shall be provided to the resident engineer if the work were scheduled to occur near those locations while nesting is potentially occurring (February 15 through August 31) or construction in the vicinity of the nesting locations could be delayed until after the young have fledged and left the nest. 2. A qualified biologist shall be present during removal of vegetation to ensure that breeding wildlife and nesting birds are not harmed. The biologist shall have the authority through the on-site project manager to redirect or temporarily stop work if threats to the species are identified during monitoring; 3. All nighttime lighting associated with the bike path or other project facilities shall be low profile and directed away from the Amargosa Creek channel and adjacent habitats to the maximum extent feasible.	Less than significant
Impact BIO-4b: Construction and operations activities could disrupt local plant communities through the introduction or spread of invasive species	**BIO-4b.1:** Areas of tamarisk and cardaria infestation on-site shall be identified and mapped prior to construction. All such areas within construction areas, including the Nature Park, shall be marked on the construction plans and clearly flagged in the field.	Less than significant

Table ES-2. Impact Summary Table

Impact	*Mitigation Measure*	*Residual Impact*
	Biological Resources (continued)	
Impact BIO-4b (continued)	**BIO-4b.2:** Prior to construction and throughout restoration, invasive non-native species, specifically including tamarisk and cardaria, shall be treated and controlled. Pre-project treatment shall encompass all areas of the project property where construction equipment will be operating, including the proposed Nature Park. Treatment shall commence sufficiently in advance of initial earthmoving to kill existing plants and infestations on-site, minimizing the chance for their spread on site as a result of earthmoving activities. Treating before construction is intended reduce the amount of viable seed or plant parts capable of resprouting that could be spread by construction thereby minimizing the potential for resprouting or spread of the species following earthmoving activities. Monitoring and treatment shall continue a minimum of three times per year, but up to five times per year until all of the performance criteria in the Nature Park Revegetation Plan have been met.	Less than significant
	BIO-4b.3: Unless access is refused by the property owner, adjacent areas of invasive non-native plant species infestation, specifically including but not limited to tamarisk and cardaria, on lands adjacent to the proposed project site shall be treated to reduce their growth and reproduction, to minimize the potential for re-infestation of the project site.	Less than significant
	BIO-4b.4: The proposed project Plan shall include an invasive non-native plant species control component to address invasive non-native plant species removal within the Nature Park, Recharge facilities, and on-site conservation areas. The Plan shall also establish performance criteria for distribution and density of invasive non-native plant species infestations.	Less than significant
	BIO-4b.5: A "weed manual" shall be prepared prior to operation and maintenance activities that shall include photographs of the different invasive non-native plant species that are present on the project site or similar habitats in the project vicinity, including tamarisk and cardaria. The weed manual shall be distributed to operations personnel, including technicians managing the recharge facilities and crews performing restoration and maintenance activities. These personnel will be instructed to look for invasive non-native plant species infestations along the access roads and at structures. Invasive non-native plant species infestations identified shall be treated or removed.	Less than significant
	BIO-4b.6: A biologist shall inspect the project site, including access roads, recharge basins and berms, at least annually for invasive non-native plant species as part of regular monitoring and maintenance activities. If invasive non-native species are found, they shall be removed using the methods provided in the proposed project Plan, or currently accepted methods. In addition, it is recommended that vehicles be washed or inspected by City of Palmdale personnel after driving through areas with identified invasive non-native plant species infestations prior to using the vehicles elsewhere to prevent the spread of those invasive non-native plant species to other areas.	Less than significant
Impact BIO-5: Removal of California juniper and Joshua trees and associated native vegetation would conflict with local policies or ordinances.	**BIO-5.1:** Juniper and Joshua trees shall be avoided to the maximum extent feasible. The project site shall be surveyed and all Joshua trees and California junipers will be marked and enumerated as specified in the City of Palmdale Native Desert Vegetation Ordinance. Protections shall be consistent with those specified in the Ordinance and may include financial incentives and penalties, and creation of exclusion zones. Trees that may be removed and those that must be protected shall be clearly shown on project plans and marked in the field. The construction plans and specifications shall include financial compensation to the construction contractor for avoiding Joshua trees and California junipers that would be permitted to be removed and financial penalties for removing trees that are designated for protection. Financial compensation shall minimally be the estimated cost of mitigating loss of that tree (planting, monitoring, maintenance, and reporting to attain three trees that meet performance criteria for each tree removed). Financial penalties shall be minimally two times the compensation amount. Exclusion zones shall be created within the nominal construction easement to protect groups of trees where feasible.	Less than significant

Table ES-2. Impact Summary Table

Impact	*Mitigation Measure*	*Residual Impact*
	Biological Resources (continued)	
Impact BIO-5 (continued)	**BIO-5.2:** Individual Joshua trees that cannot be avoided during construction shall be salvaged and transplanted if feasible in an on-site location specified in the plans for the Nature Park restoration. Salvage and transplantation methods, their feasibility, and likelihood of success shall be as determined by the City Arborist or a qualified independent landscape contractor. In the event that salvaging and transplanting is not feasible, one or a combination of the following two mitigation measures shall be implemented: 1) Joshua trees planted at unnaturally high densities in a portion of the site as mitigation for other projects shall be transplanted in the Nature Park area as part of the restoration; and/or 2) The Nature Park shall accept salvaged desert species from other projects (primarily Joshua trees and cacti).	Less than significant
	Cultural Resources	
Impact CR-1: The project is unlikely, but has the potential to adversely affect a resource listed in or eligible for listing in the NRHP, the CRHR, or otherwise considered a unique or important archaeological resource under CEQA.	**CR-1.1**: **Archaeological Monitor.** A qualified archaeological/paleontological monitor shall be retained before initiation of construction and shall be present during ground-disturbing activities associated with pipeline trenching and construction of recharge basins, as these activities have the greatest likelihood of disturbing unknown archaeological resources. In the event that previously unknown, intact, cultural resources are encountered during construction activities, work shall be temporarily halted and redirected until the qualified archaeologist can evaluate the significance of the find. If significant, the cultural remains shall be mitigated consistent with the State Historic Preservation Officer Guidelines.	Less than significant
	CR-1.2: Project Archaeologist. In the event that previously unknown, intact, cultural resources are encountered during project-related operational activities operational activities, work shall be temporarily halted and redirected until the qualified archaeologist can evaluate the significance of the find. If significant, the cultural remains shall be mitigated consistent with the State Historic Preservation Officer Guidelines.	Less than significant
	CR-1.3: Proper Notification of Human Remains. In the event that human remains are discovered during ground-disturbing activities associated with construction or operation of the project elements, an appropriate representative of Native American grounds and the County Corner shall be informed and consulted as required by law.	Less than significant
Impact CR-2: The proposed project is unlikely, but has the potential to result in the permanent loss of, or loss of access to a paleontological resource of regional or statewide significance.	**CR-2.1**: **Project Paleontologist.** An archaeological/paleontological monitor shall be retained before initiation of construction and shall be present during ground-disturbing activities associated with pipeline trenching and construction of recharge basins, as these activities have the greatest likelihood of disturbing unknown archaeological resources. In the event that previously unknown, paleontological resources are encountered during project-related activities, work shall be temporarily halted and redirected until the qualified paleontologist can evaluate the significance of the find. The project paleontologist shall have the authority to temporarily divert or redirect grading to allow time to evaluate exposed fossil material.	Less than significant
	Geology and Soils	
Impact GEO-6: During operations, seismic-related ground motion (shaking) could cause liquefaction, settlement, or surface cracks at the site and attendant damage to proposed structures, but would not likely expose the public to substantial risk of injury.	**GEO-6:** Groundwater monitoring wells shall be installed at the project site to determine whether groundwater levels rise within 40 feet of the ground surface, as a result of recharge operations, to detect the potential for liquefaction. The wells shall be installed to a minimum depth of 50 feet at the down gradient perimeter of the project site and eastward of the Amargosa Creek Diversion. In the event that groundwater levels are measured within 40 feet of the ground surface, recharge quantities shall be reduced until groundwater levels fall below 40 feet.	Less than significant

Table ES-2. Impact Summary Table

Impact	*Mitigation Measure*	*Residual Impact*
Hydrology and Water Quality		
Impact WR-1: Proposed project operation would potentially cause a substantial favorable change in surface water or groundwater availability and would not cause a substantial adverse change in surface water availability.	***WR-1a:*** In order to maintain the existing channel seepage for downstream overlying groundwater users, the streamflow shall be monitored at the POD to ensure sufficient flows past the POD to the meet the downstream channel seepage requirements.	Less than significant for surface water quality and availability Beneficial for groundwater availability
Impact WR-2: Proposed project operation would not cause a substantial adverse change in surface water or groundwater quality.	***WR-2a:*** In order to prevent equipment from releasing hazardous materials into the creek in sudden runoff events, construction of in-channel facilities shall not occur if an imminent storm event is expected. In-channel construction may resume once the channel dries sufficiently to support equipment. No equipment shall be left in the creek bed overnight or over weekend non-work periods.	Less than significant
Impact WR-3: Proposed project operation would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.	***WR-3a:*** In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall cease prior to an expected imminent storm event. If a partially constructed berm is in place, it shall be removed if there is a chance it would alter the course of Amargosa Creek or result in off-site flooding. No equipment shall be left in the creek bed overnight or over the weekend non-work periods.	Less than significant
Noise		
Impact NOISE-1: The project would generate short-term noise levels of 65 dBA that could affect sensitive receptors during construction.	**Noise-1.1: Construction Equipment.** Construction equipment powered by internal combustion engines shall be properly muffled and maintained	Less than significant
	Noise-1.2: Idling Prohibitions. Unnecessary idling of internal combustion engines near noise-sensitive areas shall be prohibited.	Less than significant
	Noise-1.3: Equipment Location. Stationary noise-generating construction equipment, such as air compressors and portable power generators, shall be located as far as practical from existing noise-sensitive land uses.	Less than significant

1 Introduction

The City of Palmdale (City) has prepared this Environmental Impact Report (EIR) to identify and evaluate the potential environmental impacts associated with implementing the proposed Upper Amargosa Project (UAP) (hereinafter "Project"). The City is the lead agency under the California Environmental Quality Act (CEQA), and is responsible for preparation of the EIR. The purpose of this document is to inform the public and decision-makers at the permitting agencies about the potential adverse and beneficial environmental impacts of the proposed project and its alternatives, and to recommend all feasible mitigation measures for significant impacts.

This EIR fulfills the requirements of CEQA (Public Resources Code, Section 21000 *et seq*.) and CEQA Guidelines (14 California Code of Regulations [CCR], Section 15000 *et seq.)*. According to CEQA Guidelines Section 15121(a) (CCR, Title 14, Division 6, Chapter 3), the purpose of an EIR is to serve as an informational document that:

> *…will inform public agency decision-makers and the public generally of the significant environmental effect of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project.*

This EIR evaluates the direct, indirect, and cumulative impacts of the project in accordance with the provisions set forth in the CEQA Guidelines. It will be used to address potentially significant environmental issues and to recommend mitigation measures that, where feasible, could reduce or eliminate significant environmental impacts.

Other state and local agencies that have jurisdiction or regulatory responsibility over components of the project would also rely on this EIR for CEQA compliance as part of their decision-making processes.

1.1 Project Background

The Antelope Valley Region of California has experienced a rapid increase in population over the past few decades. The number of residents within the Antelope Valley Region expanded more than 330 percent between 1970 and 2005, growing from 103,000 people in 1970 to 444,000 people in 2005. Forecasts predict the population to continue to swell, potentially reaching 1,174,000 residents by the year 2035.

The water currently used in the Antelope Valley Region comes from two sources: (1) naturally occurring water within the Antelope Valley Region (surface water and groundwater accumulated from rain and snow that falls in the Antelope Valley and surrounding mountains), and (2) State Water Project water (surface water that is collected in northern California and imported via the California Aqueduct into the Antelope Valley and other areas around the state). Water managers and local planners are looking for ways to provide reliable water supply to meet the Antelope Valley Region's future water demand.

1.1.1 Antelope Valley Integrated Regional Water Management Plan

The Antelope Valley Integrated Regional Water Management Plan (IRWMP) addresses the primary goal of sustainable water resources management in the Antelope Valley Region through 2035 (Regional Water Management Group 2007). The purpose of the IRWMP is to define a meaningful course of action to meet the expected demands for water resources within the entire Antelope Valley Region through 2035. IRWMP objectives for water management within the region include the following:

- Provide reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035;
- Establish a contingency plan to meet water supply needs of the Antelope Valley Region during a plausible disruption of SWP water deliveries;
- Stabilize groundwater levels at current conditions;
- Provide drinking water that meets customer expectations;
- Protect aquifer from contamination;
- Protect natural streams and recharge areas from contamination;
- Maximize beneficial use of recycled water;
- Reduce negative impacts of stormwater, urban runoff, and nuisance water;
- Preserve open space and natural habitats that protect and enhance water resources and species in the Antelope Valley Region;
- Maintain agricultural land uses within the Antelope Valley Region;
- Meet growing demand for recreational space; and
- Improve integrated land use planning to support water management.

The IRWMP evaluates projects proposed under the Plan and identifies several high priority projects recommended for implementation (Regional Water Management Group 2007). This proposed project is listed as one of these high priority projects.

1.2 Project Purpose and Need

The City is a participant in the IRWMP, a multi-agency collaborative effort developed to address regional concerns about water supply reliability, water quality, flood protection, environmental resources, and land use management in the Antelope Valley. One of the objectives of the IRWMP is to reduce the mismatch between water supply and water demand in the region. The UAP, one of several projects proposed in the IRWMP, would increase the ability of local SWP contractors to more fully utilize their allocation of imported SWP water by storing available but unused allocations in the Antelope Valley Groundwater Aquifer. The primary purpose of the UAP is to recharge the Antelope Valley Groundwater Basin using surface water supplies originating from SWP water (via the California Aqueduct) and excess stormwater runoff from Armargosa Creek. The project would enable the storage of imported SWP water during the winter and spring when the demand and environmental impacts in the Bay-Delta region are lower, and when water is available within the user's allocation. In addition, excess stormwater flows in Amargosa Creek that currently go unused would also be diverted for recharge. The recharged water would be extracted at a later date and used to satisfy peak summertime demand that exceeds the region's current ability to divert imported water during that period and also to improve overall water supply reliability in dry years by storing water in the aquifer.

The secondary purpose of the Project is to provide a community native habitat conservation area and nature park that incorporates habitat enhancement and restoration, visitor-serving amenities, and educational and interpretive displays on local biological and water resources.

1.3 Project Objectives

CEQA requires that an EIR state the objectives of a proposed project to explain the reasons for project development and why this particular solution is being recommended. The project objectives are instrumental in determining the alternatives considered in the EIR.

The primary project objective is to provide a facility, to be constructed on a site owned by the City of Palmdale, that provides for groundwater recharge of surface water supplies originating from the California Aqueduct and Armargosa Creek Watershed. Other objectives include the following:

- Maximize the potential for groundwater recharge;
- Preserve and enhance existing native habitat;
- Preserve natural open space on steeper terrain/hillside areas;
- Provide for passive recreational uses for the general public including multi-use bike paths and interpretive displays, while minimizing effects of public access on the environment;
- Minimize adverse impacts to environmental resources;
- Provide harmony between the project and adjacent land uses;
- Adhere to local, state, and federal environmental regulations; and
- Adhere to local building code and zoning regulations.

1.4 Scope of EIR

The City of Palmdale prepared an Initial Study (IS) to identify potentially significant impacts resulting from the UAP Project implementation. The completed IS was circulated as part of the Notice of Preparation (NOP) of this EIR. This EIR discusses those environmental resource areas identified in the NOP/ IS as having the potential to be significantly impacted by the proposed project as well as those considered to be adverse, but less than significant, as required under CEQA Guidelines Section 15126. These resource areas include:

- Air Quality
- Biological Resources
- Cultural Resources
- Geology
- Hazards
- Hydrology
- Land Use
- Noise
- Transportation
- Other Resources (Public Recreation and Utilities and Service Systems)

1.5 EIR Organization

This EIR is organized into chapters that present the information required under CEQA as follows:

Executive Summary. Provides a summary of the findings of the EIR, including overviews of the proposed project, the alternatives, and the environmental impacts.

Chapter 1.0: Introduction. Discusses the purpose and need, objectives, regulatory requirements, and scope of the EIR. Additionally, provides information on the public involvement during the NOP/IS public review period and the public scoping process.

Chapter 2.0: Project Description. Describes the proposed UAP Project and summarized design features, operational procedures, environmental control measures, and site closure information.

Chatter 3.0: Environmental Setting and Impact Analysis. This section is organized by resource area. Each resource area provides a description of the environmental setting, the impacts associated

with the proposed project, and mitigation measures that would be implemented to avoid, minimize, reduce, or compensate for those impacts.

Chapter 4.0: Cumulative Impact Analysis.

Chapter 5.0: Alternative Comparison. Evaluates alternatives to the proposed project. Four alternatives to the proposed project were considered including the No Project Alternative.

Chapter 6.0: Other Required Sections. Defines and identifies short-term uses of the environment and long-term productivity, significant irreversible changes to the environment, and growth-inducing impacts.

Chapter 7.0: Organizations & Persons Contacted. Lists persons, agencies, and organizations contacted during the preparation of this document.

Chapter 8.0: List of Preparers. Lists the preparers of this document.

Chapter 9.0: References. Lists references used in the preparation of this document.

In addition, a separately bound volume of appendices contain detailed documentation related to various technical analysis presented in the EIR, including the following:

Appendix A-1: Pollutant Emission Estimations for the Upper Amargosa Project

Appendix A-2: Air Quality Calculation Tables

Appendix B-1: List of Wildlife Observed during Site Survey

Appendix B-2: Small Mammal Trapping Survey

Appendix B-3: Cumulative Human Impact Evaluation (CHIE) Survey for Mohave Ground Squirrels

Appendix C: Upper Amargosa Project Water Report

Appendix D: Noise Impact Calculations

1.6 Public Involvement

The City issued a Notice of Preparation/Initial Study (NOP/IS) for the UAP on September 11, 2008. The NOP/IS described the Project and the environmental review process and solicited public input on environmental issues to be addressed in the EIR. Copies of the NOP/IS were distributed to various agencies, organizations and individuals during the 30-day review period. The NOP and IS was also made available for review at various libraries. During the public review period, six comment letters were received with two additional comment letters received after the 30 day review period.

The City conducted a public scoping meeting on September 25, 2008 at the City of Palmdale. During this meeting the City presented information on the project and solicited public input on topics to be addressed in the EIR. During the Scoping meeting three individuals provided comments.

Table 1-1 summarizes the environmental issues that were identified during the NOP/IS public review period and the public scoping process and indicates the EIR sections in which these issues were addressed.

Table 1-1. Comments Received During the Public Scoping and Public Review Process

Commenter	*Comment Summary*	*Addressed in EIR Section*
Public Scoping Meeting		
Commenter #1	Concerned about equestrian use of Nature Park facility and the effect of such use on water quality.	3.7 Hydrology
Commenter #2	Concerned that the proposed project would result in an increase in use of the area by coyotes.	3.3 Biological Resources
Commenter #3	Concerned about use of the facility as a wildlife corridor.	3.3 Biological Resources
NOP/IS Public Review		
Native American Heritage Commision (NAHC)	To adequate assess the project-related impacts the Commission recommends contacting the California Historic Information Center, requesting a Sacred Lands file from the NAHC and providing mitigation provisions for accidently discovered archeological resources.	3.4 Cultural Resources
County Sanitation Districts of Los Angeles County	Portions of the project are within District 14 and District 20. The district should be consulted if sewerage service is required in future. The Districts maintain sewer facilities within project area and approval to construct withn a District sewer easement and/or over or near a Districts' sewer is required before construction may begin.	1.0 Introduction, Table 1-2
California Department of Public Health (CDPH)	CDPH is responsible for issuing water supply permits under the Safe Water Drinking program and may need to issue a new or amended permit for the above referenced project.	3.7 Hydrology and Water Quality
County of Los Angeles Fire Department	Potential impacts to erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Fire Zone 4, archeological and cultural resource, and the County Oak Tree Ordinance should be addressed.	3.3 Biological Resources 3.4 Cultural Resources 3.7 Hydrology and Water Quality
County of Los Angeles Department of Public Works	All or portion of the site is within potentially liquefiable and earthquake-induced landslide area, and all geotechnical issues discussed in the NOP/Initial Study should be addressed in the EIR.	3.5 Geology and Soils
State Water Resources Control Board	DEIR should evaluate impacts to instream resources, identify appropriate bypass flows for the protection of public trust resources, and identify how much water must be bypassed to satisfy downstream prior rights.	3.7 Hydrology and Water Quality
California Regional Water Quality Control Board Lahontan Region	The Draft EIR needs to describe plans to minimize discharge of waste to surface waters, including a stormwater pollution prevention plan.	3.7 Hydrology and Water Quality
Antelope Valley Air Quality Management District	The District has reviewed the Initial Study for the project and concurs with the air mitigation measures. Based on this information the District has no comments	3.2 Air Quality

1.7 Regulatory Requirements

The California Environmental Quality Act (CEQA) of 1970, as amended, (Public Resources Code §21000 et seq.) and its implementing State CEQA Guidelines (14 CCR §15000 et seq.), require the consideration of environmental impacts when approving projects and prior to the issuance of governmental agency permits or approvals. Major permits and approvals for the UAP Project will be required from a number of agencies as summarized in Table 1-2. Regulations related to specific resource areas (e.g., water quality and air quality) are discussed within their respective sections of Chapter 3.0.

Table 1-2. Permits/Approvals Required

Permit/Approval	*Agency(ies)*
Site Plan Review	City of Palmdale
General Plan Amendment/Zone Change	City of Palmdale
Construction National Pollutant Discharge Elimination System (NPDES) Permit	State Water Resources Control Board/Lahonton Regional Water Quality Control Board
Water Right to Divert from Amargosa Creek	State Water Resources Control Board
Memorandum of Agreement between participating water resource agencies	City of Palmdale; Palmdale Water District [PWD]; (Antelope Valley-East Kern Water Agency [AVEK]; and Littlerock Creek Irrigation District [LCID], Los Angeles County Waterworks District 40)
Streambed Alteration Agreement	California Department of Fish and Game
Approval to construct within sewer easements and/or over or near sewer	County of Sanitation Districts of Los Angeles County

2 Project Description

2.1 Project Overview

The City of Palmdale proposes to develop the Upper Amargosa Project (UAP) on approximately 87 acres located within the City limits (Figures 2-1 and 2-2). The UAP would include the following components:

1) Approximately 20-acre recharge facility, including recharge basins and infrastructure;
2) a 38-acre community nature park containing multi-use pathways, picnic tables, interpretive plaques, and habitat enhancement/restoration areas;
3) a 22-acre native habitat conservation area; and
4) 7 acres of open stream channel.

The purpose of this recharge facility would be to provide increased groundwater recharge to the Antelope Valley Groundwater Basin. The recharge facility would receive water from two sources, the State Water Project (SWP) and the Amargosa Creek watershed. The recharge facility would consist of two in-channel basins and six off-channel basins designed to retain water and allow it to infiltrate into the ground. Maximum recharge estimates, based on a full year operation schedule, range from approximately 22,000 acre feet per year (AFY) to 80,000 AFY, and would average 36,500 AFY. Based on the proposed operation schedule where recharge basins would be out of operation during summer months when water may not be available, the recharge facilities would recharge between 14,500 AFY to 53,000 AFY, and would average approximately 24,300 AFY. The total combined (SWP water and Amargosa Creek stormwater runoff) annual average available water for the UAP would be approximately 25,400 AFY.

The three local state water project contractors (Antelope Valley-East Kern Water Agency [AVEK], Palmdale Water District [PWD], and Littlerock Creek Irrigation District [LCID]) would, following negotiation of a Memorandum of Understanding (MOU), deliver a portion of their available SWP water supply to the UAP recharge facility. The project, under the planned MOU, would divert an average of approximately 24,300 AFY of their currently unused SWP allocations for recharge (Kennedy/Jenks 2008). There is also a potential to obtain additional water from other SWP contractors when their SWP allocations exceed existing water demands. The project would also divert stormwater from Amargosa Creek to the UAP recharge facilities under a diversion permit that would be obtained from the State Water Resources Control Board (SWRCB) pursuant to an application to divert streamflow. Water diverted to recharge the Antelope Valley Groundwater Basin aquifer could then be extracted from the basin at a later date for use within the City and surrounding communities.

In conjunction with the recharge facility, a community nature park would be created within the boundaries of the project site. The nature park would provide recreational and educational opportunities, including 2.5 miles of multi-use pathways through the nature park and around the proposed recharge basins. The pathways would facilitate the community's continued use of the area and link to existing trails and bike pathways within the City (Figure 2-3). Passive recreational amenities (i.e., ramadas and picnic tables) would be placed within the park. The nature park would include the enhancement and restoration of previously disturbed habitat to remove non-native vegetation and restore native Mojave Desert scrub, riparian vegetation, and wildlife habitat. Educational displays and interpretive plaques would be located throughout the nature park to provide information on local biological and water resources (i.e., desert environment, native plants and animals, watershed processes, urban runoff, and the recharge facilities).

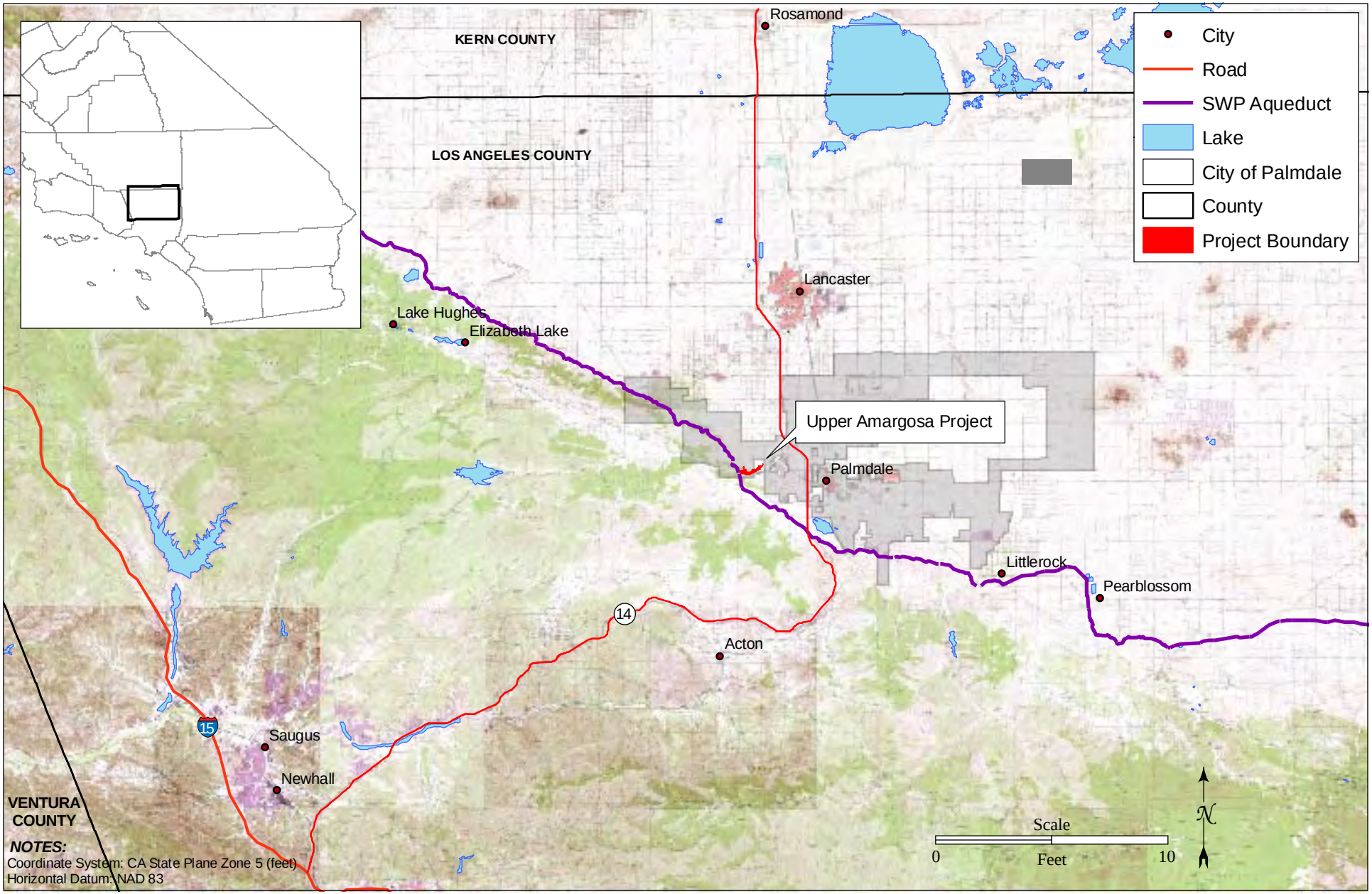
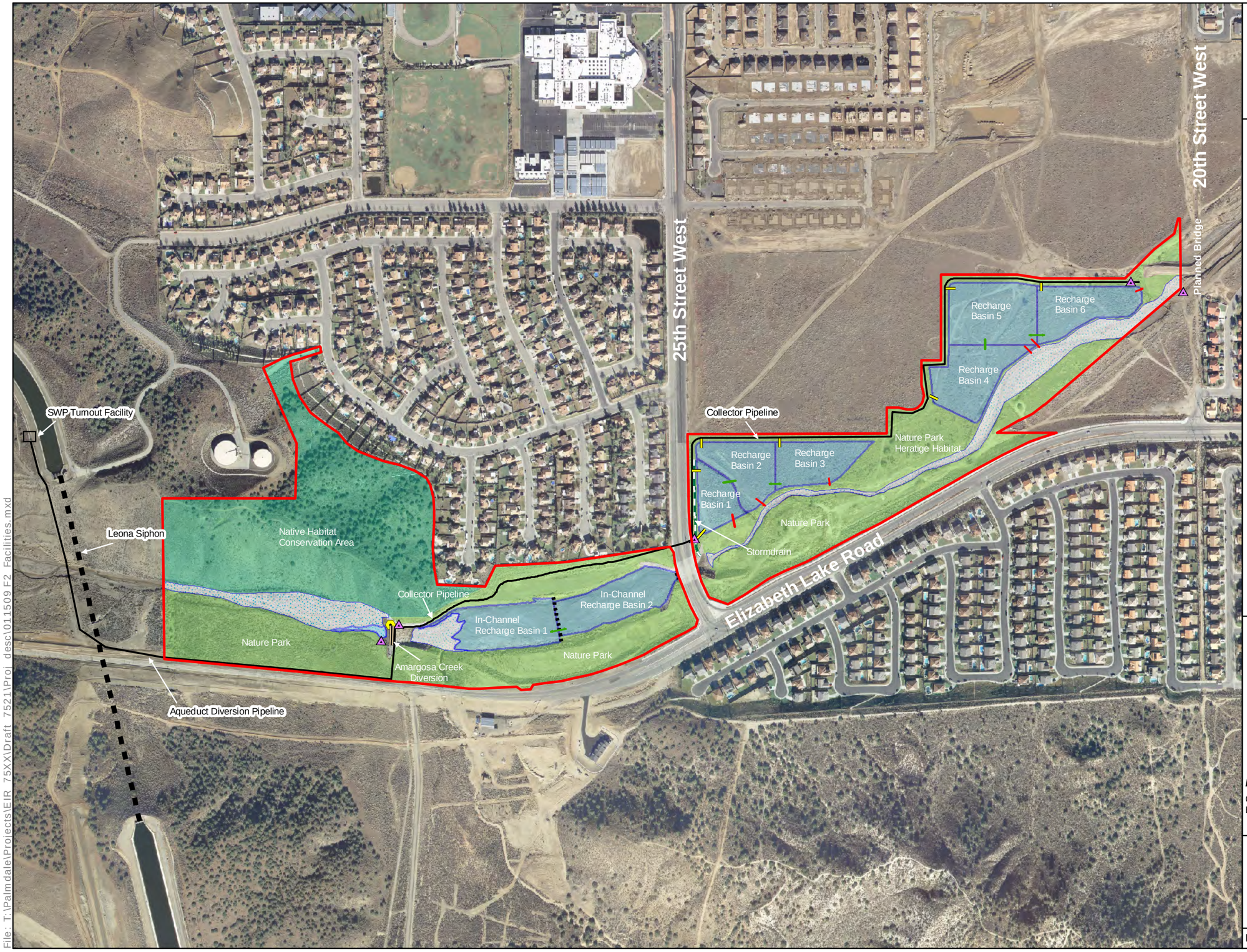


Figure 2-1. Upper Amargosa Project Vicinity Map

Upper Amargosa Project

- Groundwater Recharge Facilities -



- Project Boundary (87 acres)
- Recharge Basin (20 acres)
- Nature Park (38 acres)
- Native Hab. Conserv. (22 acres)
- Open Stream Channel (7 acres)
- Push-Up Dam
- Conveyance Pipe
- Storm Drain with Outlet Structure
- Basin Inlet Pipe/Valve with Flow Measurement
- Interpond Pipe/Gate/Weir with Flow Measurement
- Return Flow Pipe/Gate/Weir with Outlet Protection/Flow Measurement
- Stream Diversion Intake Structure/Headgate
- Flow Measurement Device

0 250 500 750 1,000

Feet

N

NOTES:

Coord Sys: State Plane NAD 83 Zone 5 U.S. Foot
Basemap: LARIAC 4-in resolution Airphoto, 2006

SAIC From Science to Solutions

FIGURE: 2-2

DATE: 01/15/09 | BY: A. Pappas

File: T:\Palmdale\Projects\EIR_75XX\Draft_7521\Proj_desc\011509 F2_Facilities.mxd

Upper Amargosa Project

- Nature Park -

- Project Boundary (87acres)
- Recharge Basin (20 acres)
- NP — Nature Park (28 acres)
- NH — Native Habitat Conservation (22 acres)
- Bike Path with Solar-Powered Lights (2.5 miles)
- Foot Path (0.5 miles)
- Education Station with Interpretive Plaque
- Picnic Table
- Ramada

0 250 500 750 1,000

Feet

Scale 1 : 5,800

NOTES:

Coord Sys: State Plane NAD 83 Zone 5 U.S. Foot
Basemap: LARIAC 4-in resolution Airphoto, 2006

SAIC From Science to Solutions

FIGURE: 2-3

DATE: 01/15/09 | BY: A. Pappas

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Twenty-two (22) acres of upland area in the northwestern portion of the project site would be dedicated as a Native Habitat Conservation Area (Figure 2-3). This area consists of mostly undisturbed habitat (i.e., low shrubs, cacti, mature juniper and annual wildflowers and would be preserved in perpetuity.

The project would also include 7 acres of open stream channel.

2.2 Site Location

The UAP is located in the southern region of Antelope Valley within the City of Palmdale in Los Angeles County, California (Figure 2-1). The project site consists of four undeveloped parcels, adjacent to Amargosa Creek and north of Elizabeth Lake Road, and extends approximately 3,000 feet from the planned 20th Street West Bridge to the existing 25th Street West Bridge, and approximately 2,700 feet west to near the Leona Siphon of the California Aqueduct (Figure 2-2). Currently, the City owns all but one 17.3 acre parcel located on the eastern portion of the project site. The city is currently in negotiations for purchase of this parcel.

2.3 Project Facilities

2.3.1 Groundwater Recharge Facilities

The groundwater recharge facilities associated with the UAP include water diversion, conveyance, and water recharge facilities (Figure 2-2).

2.3.1.1 Water Diversion Facilities

The water diversion facilities would divert water from the California Aqueduct (SWP) and Amargosa Creek into the project recharge basins. The function of each of these facilities is described below.

2.3.1.1.1 SWP Water Diversion

SWP water would be the primary water source for the UAP. The California Aqueduct, which conveys SWP water from northern California, lies immediately west of the project site extending in a north-south alignment. The SWP California Aqueduct crosses the Leona Valley in the Leona Siphon, a structure that conveys the SWP water under the existing Amargosa Creek channel. The project would include construction of the Upper Amargosa Creek Turnout in the California Aqueduct north of the Leona Siphon, located approximately 200 feet higher in elevation and 700 feet northwest of the western edge of the project site (Figure 2-2). The Upper Amargosa Creek Turnout would consist of a small protective enclosure building, intake and outlet pipes, pump, and ancillary equipment necessary to withdraw water from the aqueduct. A pipeline (the Aqueduct Diversion Pipeline) would be constructed to convey SWP water from the Upper Amargosa Creek Turnout to the Amargosa Creek Diversion (shown on Figure 2-2).

2.3.1.1.2 Amargosa Creek Diversion

Stormwater diverted from Amargosa Creek would provide a secondary water source to the project. The Amargosa watershed area upstream of the proposed diversion point is approximately 29 square miles. The average annual rainfall within the watershed is approximately 15 inches per year based on the average annual precipitation of weather station 122 in Leona Valley. Amargosa Creek is dry most of the year with occasional high-flows during storms. An estimated average annual discharge from the watershed is approximately 2,600 AF for an average annual rainfall of 15 inches, and the maximum annual discharge could be 10,000 AF. The watershed characteristics and modeling of Amargosa Creek are described in detail in Appendix C: Water Resource Evaluation of Amargosa Creek (SAIC WR).

Studies indicate that peak flows in Amargosa Creek may be as high as 3,500 cubic feet per second (cfs) and are of relatively short duration (PACE 2003). The Amargosa Creek Diversion would be designed to divert stormwater from the channel at a maximum rate of 100 cfs. The Amargosa Creek Diversion would consist of a 100-foot-long low-head (less than 3 feet in height) dam and an intake structure. The dam would be located immediately upstream of an existing engineered in-channel stabilization on the western project site boundary, with the intake on the northern side of the creek (Figure 2-2). The intake structure would enable water to be diverted from Amargosa Creek to the off-channel basins, flowing from the diversion point to the basins through the Collector Pipeline (Section 2.3.1.2.2).

The City of Palmdale has applied to the State Water Resources Control Board for the right to appropriate water from Amargosa Creek. The application seeks to divert up to 2,700 acre feet per year from Amargosa Creek at a maximum rate of 100 cubic feet per second during the rainy season (October 1 to May 31) when excess water is present in the creek. The project would divert only that portion of the flow not necessary to support downstream uses, including habitat values. Therefore, in most years, the full 2,700 acre feet could not be diverted while ensuring sufficient flow to support downstream uses. A lesser amount would be diverted in these years, which amount may be zero in dry years. In some very wet years, more than 2,700 acre feet could theoretically be available. However, the maximum diversion in any given year, even if very wet, would be 2,700 acre feet.

Based on watershed modeling of the historic hydrological record for the 13 year period from 1965 to 1977, using the full diversion and recharge capacity of the UAP approximately, 2,700 AF could be divereted in a maximum year and on average 1,100 AFY could be diverted for recharge. In order to maintain existing channel seepage for the downstream groundwater users, the proposed diversion would be reduced to approximately 1,400 AF in a maximum year and 400 AFY on average (SAIC WR).

2.3.1.2 Water Conveyance Facilities

As described above, conveyance facilities would convey water from two sources, the California Aqueduct and Amargosa Creek, to the recharge basins (Figure 2-2). The Aqueduct Diversion Pipeline would extend from the Upper Amargosa Creek Turnout to the Amargosa Creek Diversion structure. Water diverted from the Aqueduct would pass through a pressure reducer at the Amargosa Creek Diversion structure and flow into the Collector Pipeline (Section 2.3.1.2.2). This pipeline would extend from the point of diversion to the off-channel recharge basins continuing to the northeastern corner of the project site. Any excess water the recharge basins could not accommodate would be returned to Amargosa Creek at the pipe's terminus (Figure 2-2).

Flow measurement devices would be installed at key locations in all water conveyance facilities to monitor flow rates into and out of the water conveyance system. Flow measurement devices would be located at the Upper Amargosa Creek Turnout, the Amargosa Creek Diversion, the Collector Pipeline return flow to Amargosa Creek, all recharge basin inflow and outflow facilities, and along Amargosa Creek upstream and downstream of the project area.

2.3.1.2.1 Aqueduct Diversion Pipeline

The Aqueduct Diversion Pipeline would be a 36-inchpipeline that would be below ground from the proposed Upper Amargosa Creek Turnout. It would be installed in a trench parallel to the Leona Siphon for approximately 1,000 feet, and would pass under the Amargosa Creek channel to Elizabeth Lake Road. At this point, the pipeline would turn to the east and parallel the northern side of Elizabeth Lake Road for approximately 1,700 feet. The pipeline would then turn north for approximately 275 feet to the Amargosa Creek Diversion, passing under the creek to a pressure reducing assembly which would connect to the 52-inch, Collector Pipeline. The total length of the Aqueduct Diversion Pipeline would be approximately

2,975feet. The Aqueduct Diversion Pipeline would be installed via trenching in existing rights-of-way for most of its length except where it crosses the project site north of Elizabeth Lake Road. Slant or horizontal drilling would be used to cross the Amargosa Creek Channel.

2.3.1.2.2 Collector Pipeline

The Collector Pipeline would extend from the Amargosa Creek Diversion to the off-channel recharge basins on the northeast portion of the site (Figure 2-2). The pipeline would be installed in a trench approximately 1,700 feet along the slope that flanks the northern edge of Amargosa Creek and would pass beneath the 25th Street West Bridge. It would then extend an additional 3,400 feet following the northern perimeter of the off-channel recharge basins and terminate near the northeastern corner of the project site boundary at Amargosa Creek just west of the proposed 20th Street West bridge. East of the 25th Street West bridge, the pipeline would be buried within the northern perimeter berms of the recharge basins; pipes with values would convey water to each basin.

A valve would control flow into the Collector Pipeline. The slope of the pipeline would be designed to produce sufficient head for gravity flow to the off-channel recharge basins, and sufficient velocity to self-cleanse sediment from the pipeline with SWP water. Manholes and/or cleanouts would be located at regular intervals along the entire length of the pipeline to facilitate cleaning out sediment and provide access for inspections and maintenance.

2.3.1.2.3 Collector Pipeline and Basin Inflow

Each recharge basin would have 36 inch "balance pipe" inlet from the Collector Pipeline and would include a valve or gate structure to control flow into the basins. This would allow each basin to operate independently such that it could be isolated from operations and left to dry for maintenance purposes while other basins continue to receive water. Each recharge basin would have engineered bank stabilization installed at the inflow gates and at the spillways into Amargosa Creek to control erosion.

2.3.1.2.4 Urban Stormwater Conveyance

Stormwater originating along 25th Street West currently spills onto the project site through an existing culvert near the northwestern corner of Recharge Basin 3, north of the 25th Street West Bridge (Figure 2-2). Stormwater from the culvert has created a gully up to 10 feet deep that generally extends from the culvert to Amargosa Creek in a southeasterly direction through the proposed location of the basins.

A 500-foot extension to the existing culvert outlet would be constructed to realign and direct urban stormwater runoff away from project recharge facilities and into Amargosa Creek. The realigned culvert would be adjacent and parallel to the eastern side the 25th Street West and would discharge into the creek at the bridge. The discharge point would include engineered bank stabilization to control erosion in the creek.

2.3.1.3 Water Recharge Facilities

The water recharge facilities would include two in-channel recharge basins located west of the 25th Street West Bridge and north of Elizabeth Lake Road and six off-channel recharge basins located on the north side of Amargosa Creek (Figure 2-2).

2.3.1.3.1 In-Channel Recharge Basins

Two in-channel recharge basins would total approximately 5.4 acres (Figure 2-2). They would be created by two earthen or "sand" dams which would be 300 feet in length and three feet in height. The dams would be designed with "flow through" gates/pipes which would allow water to flow past the dams to meet downstream water demands. The dams would be located west of the 25th Street West Bridge. This is an area in which the stream channel is wide and would allow stream flow to be spread over a large area, increasing the time and area available for water to infiltrate and recharge the aquifer.

2.3.1.3.2 Off-Channel Recharge Basins

Each of the off-channel recharge basins would be connected to the Collector Pipeline to allow delivery of SWP water and Amargosa Creek water. Three basins would be located east of 25th Street West (Recharge Basins 1, 2, and 3) and another three basins (Recharge Basins 4, 5, and 6) would be located within the northeastern portion of the project site (Figure 2-2). The off-channel recharge basins would be separated from Amargosa Creek by exterior berms and from one another by interior berms. Berms would be up to 15 feet wide on top with a 3:1 slope ratio (Figure 2-4) and the exterior of each berm would be vegetated with native plantings. Basin Balance Pipelines with valves would be installed through the interior berms to control water flow between individual basins (Figure 2-2). Additional return flow pipes (one per basin) would be installed in the berms adjacent to the creek to permit excess water to be released to the creek. Engineered bank stabilization would be installed on the discharge end of all return flow pipes to control erosion along Amargosa Creek. In addition, emergency spillways with erosion control features would be constructed on each of the exterior basin berms to allow overflow of excess water while preventing water from overtopping the berms, minimizing the potential for berm damage and erosion.

The off-channel basins would be designed to allow a basin to be taken out of operation for routine maintenance while the other basins remain operational. Each basin would be taken out of service for maintenance at least once annually or when the infiltration rate diminishes substantially. Basin maintenance would normally occur during the summer when water flows would be minimal.

2.3.2 Nature Park Facilities

The project would include a 38-acre nature park that will preserve and enhance native vegetation and provide walking and bike pathways, picnic facilities, covered benches, and interpretive displays (Figure 2-3).

2.3.2.1 Habitat Enhancement/Restoration

Enhancement and restoration of native vegetation and habitat would occur on approximately 38 acres within the project area. The restoration area would be divided into several habitat zones, each with differing design considerations. Wherever possible, existing native plant species would be preserved on site, with priority going to those species with the longest lifespan and which require the greatest time to establish and reach maturity (i.e. Joshua tree, California juniper, Mormon tea, and peach thorn).

Site restoration would involve removing non-native vegetation along with accumulated refuse and debris caused by past human activities. The project area between Elizabeth Lake Road and Amargosa Creek would be enhanced and restored by revegetating with plant species native to the Amargosa Creek watershed. Native shrub species such as big sagebrush, fourwing saltbush, creek senecio, and cotton thorn would be used as they establish readily and mature quickly, reaching normal stature within 5-10 years.

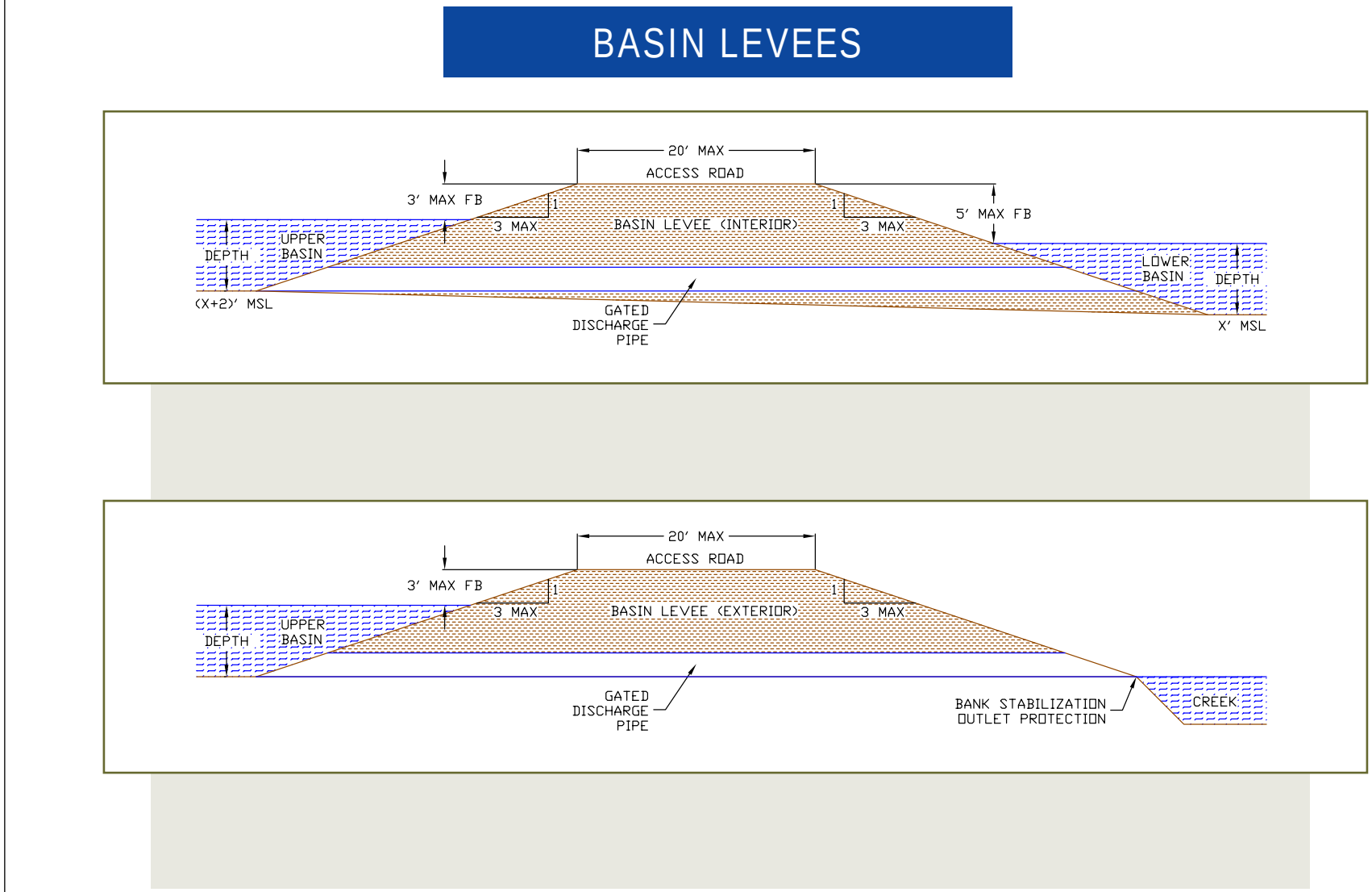

Figure 2-4. Berm Design Details

2.3.2.1.1 Heritage Habitat Preservation/Enhancement Area

The cornerstone of the nature park is a three-acre parcel of "Heritage Habitat" that would preserve century's old- Joshua and Juniper trees and selectively add native plants to barren areas. Non-native vegetation would be removed from the Heritage Habitat to the extent feasible. Located on the north side of Amargosa Creek (Figure 2-3), the Heritage Habitat would be accessed by foot paths along which plant identification placards and interpretive storyboards would be placed. The pathways in this parcel would be lined with a low decorative fence to impede vehicular and pedestrian access and protect the native habitat. The project would generally enhance the habitat throughout the facility, except where the recharge basins are constructed, by removing non-native species and replacing them with native species where feasible. The areas involved in the recharge basins contain largely non-native or degraded habitat.

2.3.2.1.2 Riparian Terrace and Road Embankment

The riparian terrace and road embankment areas would consist of approximately 13 acres within the project site (Figure 2-3). This area of the project site is elevated above Amargosa Creek and not generally subject to flooding. Portions of this area currently contain a sewer line with manhole covers, outflows from stormwater culverts, the Elizabeth Lake Road embankment, a small concrete apron, and unimproved roads and pathways. The area is moderately to sparsely vegetated with native and non-native species.

Enhancement and revegetation activities in this area would include removing non-native species and revegetating the road embankments with large shrubs such as squawbush, desert olive, quailbush, California juniper, and birchleaf mountain mahogany. California juniper and Joshua trees currently exist within this area would be retained. Vegetation along this area would provide a visual buffer between the project site and Elizabeth Lake Road.

Picnic tables, benches, shade structures (ramadas), and the bike pathway would be concentrated in this zone to minimize the potential for flood damage to these improvements (Figure 2-5).

2.3.2.2 Multi-Use Paths

Approximately 2.5 miles of multi-use pathways would be constructed through the nature park and around the off-channel recharge basins. Unpaved, crushed granite trails would provide access to the Heritage Habitat area and the nature park. Approximately 1.6 miles of the 2.5 miles multi-use path would be located in the five acre riparian terrace and on top of engineered berms around the off-channel recharge basins. The paved paths on the berms would also provide access for maintenance vehicles. Solar-powered lights would provide illumination throughout the site, utilizing a renewable energy source and avoiding electric utility line installation.

2.3.2.3 Park Amenities

Educational displays and interpretive signs would be placed at strategic locations along the bike path and trail network to provide information on the desert environment, native plants and animals, urban runoff, watershed processes, and the recharge facilities (Figure 2-5). Covered ramadas and picnic tables located within the park would provide passive recreational areas for park visitors.

2.3.3 Native Habitat Conservation Area

The native habitat conservation area covers approximately 22 acres in the northwestern portion of the project site (Figure 2-3). The conservation area includes a very steep south-facing slope adjacent to Amargosa Creek parallel with the ridge to the north. This slope is vegetated with a variety of low shrubs,

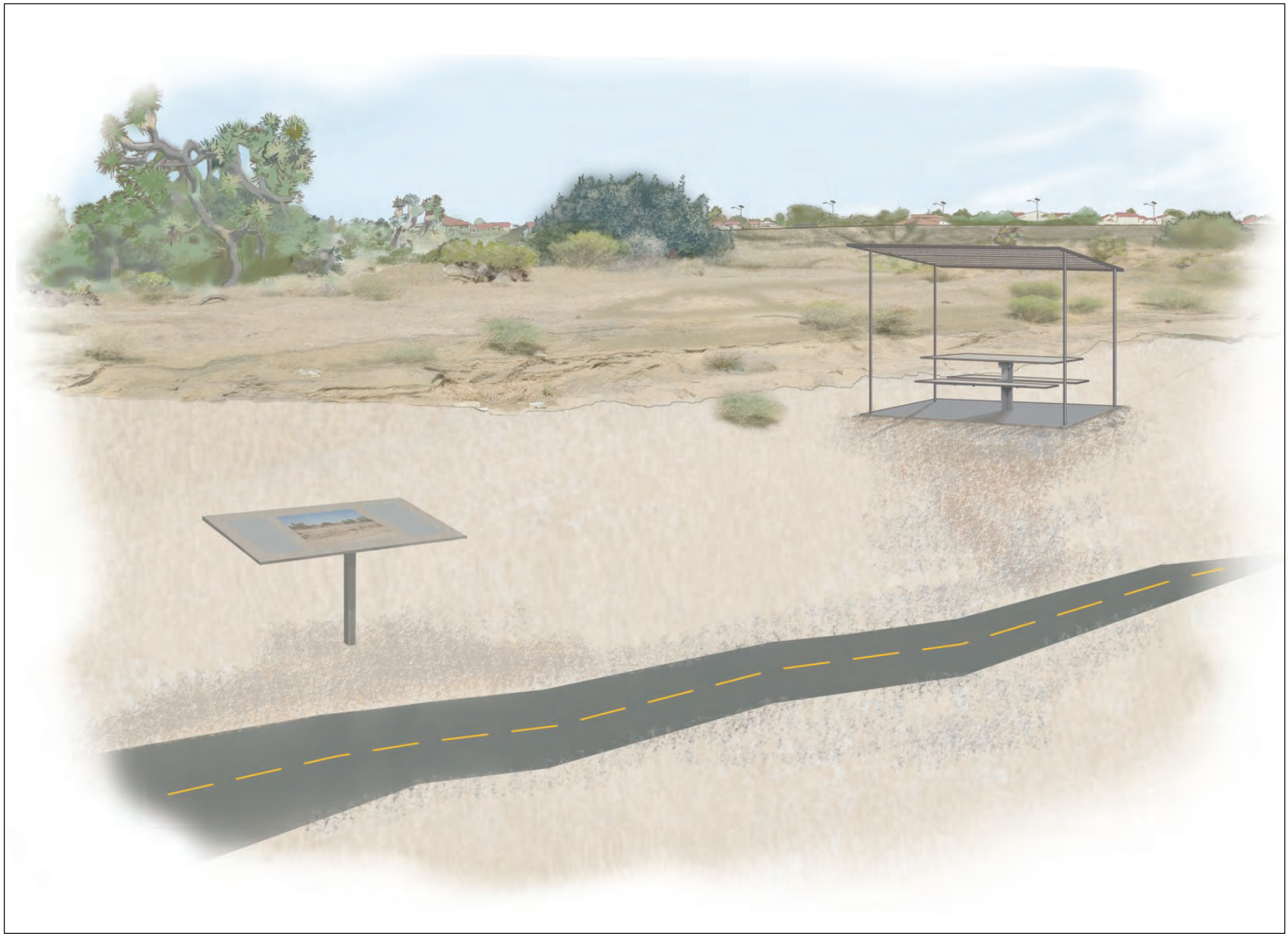

Figure 2-5. Park Amenities

cacti, and annual wildflowers. The north-facing slope from the ridgeline is gentler, juniper-studded terrain, sloping to the north and east. Space between junipers supports a variety of native annual and perennial wildflowers and low shrubs, and Joshua trees.

Minimal restoration would be required in the native habitat conservation area because it already consists largely of native vegetation.

2.4 Construction

Construction would involve between 20 to 40 workers per week with a maximum of approximately 80 workers per week.

2.4.1 Geotechnical Considerations

Preliminary percolation demonstrations tests were completed at the site that indicated percolation rates between three and eleven feet per day (SAIC 2007).

The proposed recharge basins would be located to maximize recharge area within project site boundaries and minimize berm erosion and maintenance requirements. The construction of the off-channel basins would balance cut and fill (i.e., material from basin excavation would be used to construct the berms and access roads). No native soil would be removed from the site and no off-site soil would be imported.

The berms enclosing the recharge basins would:

- retain water within the basins;
- prevent Amargosa Creek from flooding the basins; and
- provide access between the recharge basins for maintenance vehicles and bike pathways.

The total length of the exterior/interior berms would be approximately 6,800 feet. Berm height and elevations would be finalized during preliminary design to optimize recharge area, ensure conveyance to all basins by gravity flow, and minimize erosion from stormwater flows in Amargosa Creek. Preliminary berm designs include a 15-foot maximum width, 3:1 side slopes, and a two- to three-foot freeboard above maximum water level (Figure 2-4). Appropriate stabilization for slopes, embankments, and berms would involve soil compaction to design specification, gravel/rip-rap/gabion armoring, or geosynthetic reinforcement.

2.4.2 Site Preparation

Various types of debris, such as broken concrete and refuse, has accumulated at the project site. Prior to project construction, debris would be removed from the project site. This would involve the separation and aggregation of types of debris in designated locations and avoiding disturbance of sensitive natural habitat. The accumulated debris would then be hauled off site by trucks for disposal and/or recycling.

2.4.3 Construction Equipment

Table 2-1 identifies the equipment and approximate days of equipment operation anticipated for project construction.

Table 2-1. Construction Equipment

Equipment	*Number*	*Total Machine Days*
Air Compressor (365 C.F.M.)	1	25
Asphalt Paver (130 H.P.)	2	4
Backhoe Loader (48 H.P.)	4	89
Bull Dozer (200 - 300 H.P.)	3	222
Dist Truck - 2000 Gallon	2	180
Dump trucks (12-16 ton)	4	35
Fence Post Auger - T.M.	2	10
Flatbed Truck (3 ton)	5	12
Gradall	2	4
Grader 30,000	1	2
Horz Boring Csg. Mch	1	7
Hyd Excavator (1.5 C.Y.)	3	82
Loader-skid steer (30 H.P. gas)	1	13
Lowbed Trailer (75 Ton)	2	1
Paint stripper -S.P.	1	1
Pick Up Truck (3/4 ton)	2	2
Road Mixer (310 H.P.)	1	6
Crane - S.P.	5	184
Tandem Roller	4	32
Truck Mounted Earth Auger	1	1
Truck Tractor (240 H.P.)	2	6
Vibr Roller (towed)	3	16
Vibrating Plates	6	176
Welder (300 amp)	3	68

2.4.4 Schedule

Construction activities are scheduled to commence in early 2010 and would last for approximately 12 months. Table 2-2 provides the estimated proposed schedule for project construction activities.

Table 2-2. Project Schedule

Stage of Construction	*Month*											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Site Prep												
Basin/Pipeline Construction												
Plumbing Facility												
Park Construction												
Revegetation												

2.5 Operations

The UAP would involve operation and maintenance of the groundwater recharge facilities, nature park, and conservation area, as discussed below.

2.5.1 Recharge Facilities

A percolation demonstration test was conducted at the project site and measured infiltration rates ranged from three to eleven feet per day (SAIC 2007). The long-term infiltration rate may be one-half the maximum or approximately 5 feet per day, based on similar locations in Southern California (SAIC

2007). Based on this percolation range and proposed operation schedule the recharge facilities would recharge between 14,500 AFY to 53,000 AFY, and would average approximately 24,000 AFY.

The recharge facility would be used to store a portion of AVEK, PWD, and LCID's allocated SWP water supply in the groundwater aquifer underlying the UAP and recharge stormwater runoff from Amargosa Creek.

All basins would operate at full capacity when excess stormwater is available in order to capture the maximum amount of water from Amargosa Creek. Thus, all basins would be prepared for winter stormwater diversions prior to the start of the rainy season. Typical stormwater flow rates for Amargosa Creek are large and brief. During these events, water would be diverted at a rate of up to 100 cfs and delivered to all basins until either the event ceases or until the basins are full. Diversions would not commence until sufficient water had flowed downstream to satisfy downstream environmental requirements.

The sand push up dams, intended to encourage in-channel recharge, would be designed to pass a designated volume of to meet the downstream water requirements before water diversion and retention commences. Water would flow past the in-channel structures via flow through gates/pipes in the dams. The dams would also be designed to washout during heavy flows and would need to be reconstructed periodically.

During the summer months, when stormwater flows are not present in Amargosa Creek, and SWP water is not being diverted, the basins would be kept out of operation (dry) to provide for regular basin maintenance (removal of silt and weeds) and drying to maintain percolation rates while maximizing recharge.

Project operations would include operation of the Upper Amargosa Creek Turnout, Aqueduct Diversion Pipeline, inflow valve, stream diversion structure, Collector Pipeline, basin water level/quality sampling, and valve/gate operations of the basins. Facility maintenance would include valve lubrication and berm and recharge basin repair and reconditioning.

2.5.2 Nature Park Operations

The nature park would accommodate up to 20 visitors per day based on the housing density of the surrounding neighborhoods. Irrigation of the native restoration areas would occur during initial vegetation establishment. Irrigation water would be supplied by existing municipal water supplies. All operations and maintenance activities would be performed by existing City staff.

2.5.3 Conservation Area

The native habitat conservation area would remain in its current natural state. Improvements to the existing trail would be made if necessary to minimize trail erosion. No regular maintenance would be required for this area.

2.6 Project Alternatives

CEQA Guidelines Section 15126.6(b) stipulates that an EIR alternatives analysis is required to:

- Focus on potentially feasible alternatives to the project or its location which are capable of avoiding or substantially reducing any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly;

- Identify an "environmentally superior" alternative to the proposed project; and
- Include analysis of the "No Project" Alternative, assuming the reasonable future use of the project parcel if the application was not approved. If the environmentally superior alternative is the No Project Alternative, the EIR must identify an additional "environmentally superior" choice among the other project alternatives.

CEQA Guidelines Section 15126.6(a) states:

- An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

The alternatives were also assessed in accordance with CEQA Guidelines Section 15126.6(f) which states:

- The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the Project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project.

The alternatives evaluated below address this reasonable range of alternatives that strive to minimize significant environmental impacts associated with the proposed project. In addition to the No Project Alternative, five other alternatives were considered during preparation of the EIR, including modified basin configurations and alternative pipeline alignments. However, only three alternatives meet most of the proposed Project's objectives and have been selected to be carried forward for detailed analysis (Section 2.6.2). Alternatives considered but not carried forward are addressed in Section 2.6.1.

2.6.1 Alternatives Considered but Not Carried Forward for Analysis

The screening process used in the EIS/EIR to evaluate a reasonable range of alternatives was based on the Project's objectives (Section 1.3). Three alternatives were considered but not carried forward for detailed analysis in the EIS/EIR because they did not adequately meet a majority of the Project objectives. These alternatives include: 1) modifying the in-channel recharge basins; 2) eliminating stormwater diversion; and 3) locating the recharge basins at another location along Amargosa Creek.

2.6.1.1 Single In-Channel Recharge Basin

This alternative would eliminate the earthen dam in the stream channel located 700 feet upstream of the 25th Street Bridge. Rather than having two shallow basins between the diversion structure and the 25th Street West Bridge, there would only be one immediately upstream of the bridge on engineered bank stabilization already in place. Under this alternative, the in-channel recharge basin would need to be deeper and the associated earthen dam approximately 6 feet high by 300 feet long adjacent to the concrete abutment of the 25th Street Bridge. The height of the earthen dam would be increased compared to the proposed project to create a 5.4 acre in-channel recharge basin. The off-channel basins would be the same

as for the proposed project. This alternative would not change the overall area available for recharge or decrease the project's projected recharge capabilities.

Due to the increase in dam size (both height and width), the six foot high earthen structure would require approximately twice the soil required for the proposed two three foot high structures. Consequently, this alternative would require substantially greater in-channel disturbance compared to the proposed Project. In addition, a six foot earthen dam would be far more visible and less in keeping with the more natural character of the proposed nature park. Also, since any in-channel earthen dams would be subject to washout in heavy rains, the amount of material that would potentially wash downstream under this alternative would be greater than for the proposed project. Therefore, this alternative was eliminated from further consideration in the EIR as having undesirable consequences in high flow events and being visually incompatible with the proposed project concept.

2.6.1.2 All In-Channel Recharge Basins

This alternative would involve only in-channel recharge basins. The off-channel basins of the proposed project would not be constructed. To achieve the necessary recharge capacity, basins would be required both above and below the 25th Street West Bridge in the stream channel. This would require the grading of the streambed to provide as large a recharge area as possible (approximately 5.4 acres west of the 25th Street West Bridge and 3.1 acres upstream of the proposed 20th Street West Bridge, or 8.4 acres, compared to 14.6 acres for the off-channel basin area). The SWP pipeline would empty into the stream channel at the diversion point rather than into the pipeline to off-channel basins. To achieve the maximum recharge area, all of the relatively flat areas of the streambed west of the proposed 20th Street West Bridge and east of the diversion structure would need to be graded to a suitable slope and retention dams constructed in the channel both in the western and eastern stream channel reaches within the project site. Two three foot earthen dams would be required in the upstream basin and three in the downstream basin. This alternative would require major alteration of most of the open stream channel within the project boundaries downstream of the proposed diversion structure, except for the deeply incised channels.

While this alternative would achieve the primary project objective of capturing SWP allocations by recharging the groundwater aquifer using in-channel basins, it would require major alterations of the streambed to do so. It would also limit the recharge capacity since a smaller physical area would be available for recharge and high flow washout of the basin berms would limit the retention period, thereby reducing the total effective recharge by approximately 50 percent. One of the objectives of the proposed project is to minimize disturbance of the stream channel, which this alternative would violate. In addition, regular use of the stream channel for the discharge of and retention of SWP water would alter the natural hydrologic regime in the affected portion of the channel by adding flow during periods when water would otherwise not be present in the stream channel and potentially altering the vegetation growing in and along the streambed. Based on the substantial level of in-channel disturbance, this alternative was eliminated from further consideration in the EIR.

2.6.1.3 Alternative Recharge Site Location along Amargosa Creek

This alternative would involve installing similar recharge facilities, but at a different location along Amargosa Creek. Other locations could conceptually be either upstream or downstream of the Proposed Project. However, a primary objective of the project is to store SWP water in a portion of the Antelope Valley Groundwater Basin where it would be accessible for future withdrawal. This would not be achieved by an upstream recharge facility. The San Andreas Fault, which is a barrier to groundwater movement, crosses just west of the Proposed Project boundary. Water diverted at a location upstream of the fault would not recharge to the Antelope Valley aquifer. Therefore, an upstream recharge basin location would not achieve a fundamental project objective and was eliminated from further consideration.

Downstream of the project site, Amargosa Creek traverses an engineered channel for approximately one mile before entering a box culvert under the Amargosa Commons, Palmdale Marketplace, and Sierra Commons shopping centers. The box culvert is approximately half a mile long. Following its exit from the box culvert, an engineered mostly concrete channel contains Amargosa Creek for another 1.2 miles to a box culvert under West Avenue O where the creek returns to its natural streambed. The total channelized or culverted run of the creek is approximately 2.7 miles overall. Therefore, there is no location downstream of the Proposed Project within the channelized portion of the creek for any recharge facility prior to the box culvert under West Avenue O.

In order to recharge State Water Project water from the California Aqueduct north of the Avenue O culvert, it would be necessary to construct a pipeline from the aqueduct to the location where the creek crosses under West Avenue O, a distance of approximately 4.3 miles. If another location downstream of the Avenue O culvert (farther north) were deemed more suitable, the pipeline would need to be correspondingly longer. Compared to the 2,975 feet (0.56 miles) for the Aqueduct Diversion Pipeline of the Proposed Project, this shortest route would require 7.7 times the length of pipe. While the vertical drop from the aqueduct to the Avenue O box culvert is approximately 330 feet, the gradient for much of the pipeline length (assumed to be within street rights of way) is considerably less than one percent. Therefore, a somewhat larger pipeline than the 36 inch line for the Proposed Project would be required or an intermediate pump station would likely be necessary to ensure adequate flow from the SWP to an alternate recharge location north of West Avenue O.

While no engineering was done for this configuration, the cost of a pipeline larger than 36 inches in diameter and 4.3 miles long, installed in street rights of way, would likely be several times the estimated cost of construction for the entire proposed project. In addition, the infiltration rates of soils in this area are unknown so the suitability of the location for recharge has not been demonstrated. Furthermore, the habitat on both sides of Amargosa Creek north of West Avenue O is mostly undisturbed natural desert scrub interrupted occasionally by dirt tracks. Off-channel recharge basins in this area would therefore impact about 20 acres of relatively undisturbed natural vegetation. In contrast, the areas of the Proposed Project that would contain the off-channel recharge basins are highly disturbed and contain only a minimum of natural vegetation. Given the considerably greater cost of this alternative, its unknown infiltration characteristics, and its substantially greater disturbance to native habitat, a downstream location along Amargosa Creek was eliminated from further consideration as being economically infeasible and environmentally unfavorable.

2.6.2 Alternatives Evaluated in the EIR

The four alternatives selected for detailed analysis in the EIR include:

1. No In-Channel Recharge Basins;
2. Reduced Off-Channel Recharge Basins;
3. Alternative Aqueduct Pipeline Routes; and
4. No Project Alternative.

These alternatives involve variations to the following project components:

- Recharge Structures
  - In-Channel Recharge Basins
  - Off-Channel Recharge Basins

- Nature Park/Habitat Conservation
- Open Stream Channel
- Pipeline Alignments

2.6.2.1 Alternative 1: No In-Channel Recharge Basins

Alternative 1 would alter the number of recharge basins. Under this alternative, construction of the in-channel recharge basins would not occur (Figure 2-6). However, the Amargosa Creek Diversion would remain to direct a portion of stormwater flows to the off-channel recharge basins. Alternative 1 would reduce impact to the Amargosa Creek stream channel and hydrologic regime of the Amargosa Creek watershed by eliminating the construction of the in-channel earthen dams. This alternative would not alter the size of the nature park or pipeline lengths/alignments.

Elimination of the in-channel recharge basins would reduce the area of stream bed disturbed and the area available for stormwater retention by 5.4 acres and increase the amount of open stream channel from 7 acres to 12.4 acres. This alternative would eliminate the extra in-channel recharge of water that would occur with in-channel dams and eliminate the need for in-channel dam construction and maintenance. Under this alternative, retention of stormwater would only occur in the off-channel recharge basins. Elimination of the in-channel recharge basins would reduce the total acres available for recharge by 27 percent of the recharge acreage; the total area of recharge facilities would be 14.6 acres. Under this alternative, the project's capacity for recharge would decrease to approximately 18,000 AFY.

2.6.2.2 Alternative 2: Reduced Off-Channel Recharge Basins

Alternative 2 would reduce the number of proposed off-channel recharge basins from six to three (Figure 2-7) and restore the unused areas as native habitat. Alternative 2 would include construction of the two in-channel recharge basins and the Amargosa Creek Diversion structures. This alternative would not alter the Aqueduct Diversion Pipeline but would reduce the length and disturbance associated with the Collector Pipeline.

Three of the proposed off-channel recharge basins (Recharge Basins 4, 5 and 6) located on 8.4 acres of the eastern portion of the project site would not be constructed. This area would become part of the Nature Park and the Nature Park would increase from 36 acres to 46 acres. Under this alternative, the Collector Pipeline would not run adjacent to the proposed nature park Heritage Habitat and would decrease in length from 5,100 feet to about 2,000 feet. This would also reduce the fairly limited potential for disturbance of sensitive vegetation associated with installation of this pipeline.

Alternative 2 would decrease the available recharge area for both SWP and stormwater by approximately 42 percent of the original recharge acreage. Under this alternative, the project's capacity for recharge would decrease to approximately 14,000 AFY.

2.6.2.3 Alternative 3: Alternative Aqueduct Diversion Pipeline Alignments

Alternative 3 would include alternative locations for the Aqueduct Diversion Pipeline. This alternative differs from the original project in that it changes the alignment of the Aqueduct Diversion Pipeline. All other aspects of the project remain as described in the proposed project. This alternative considers two different pipeline alignments; Alignment "A" located on the north side of Amargosa Creek; and Alignment "B" buried in the Amargosa Creek stream channel (Figure 2-8).

Upper Amargosa Project

Alternative 1
Modified In-Stream Recharge Basin

- Project Boundary (87 acres)
- Recharge Basin (20 acres)
- Nature Park (28 acres)
- Native Hab. Conserv. (22 acres)
- Open Stream Channel (7 acres)
- Undesignated Land (10 acres)
- Push-Up Dam
- Conveyance Pipe
- Storm Drain with Outlet Structure
- Basin Inlet Pipe/Valve with Flow Measurement
- Interpond Pipe/Gate/Weir with Flow Measurement
- Return Flow Pipe/Gate/Weir with Outlet Protection/Flow Measurement
- Stream Diversion Intake Structure/Headgate
- Flow Measurement Device

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Feet

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NOTES:

Coord Sys: State Plane NAD 83 Zone 5 U.S. Foot
Basemap: LARIAC 4-in resolution Airphoto, 2006

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FIGURE: 2-6

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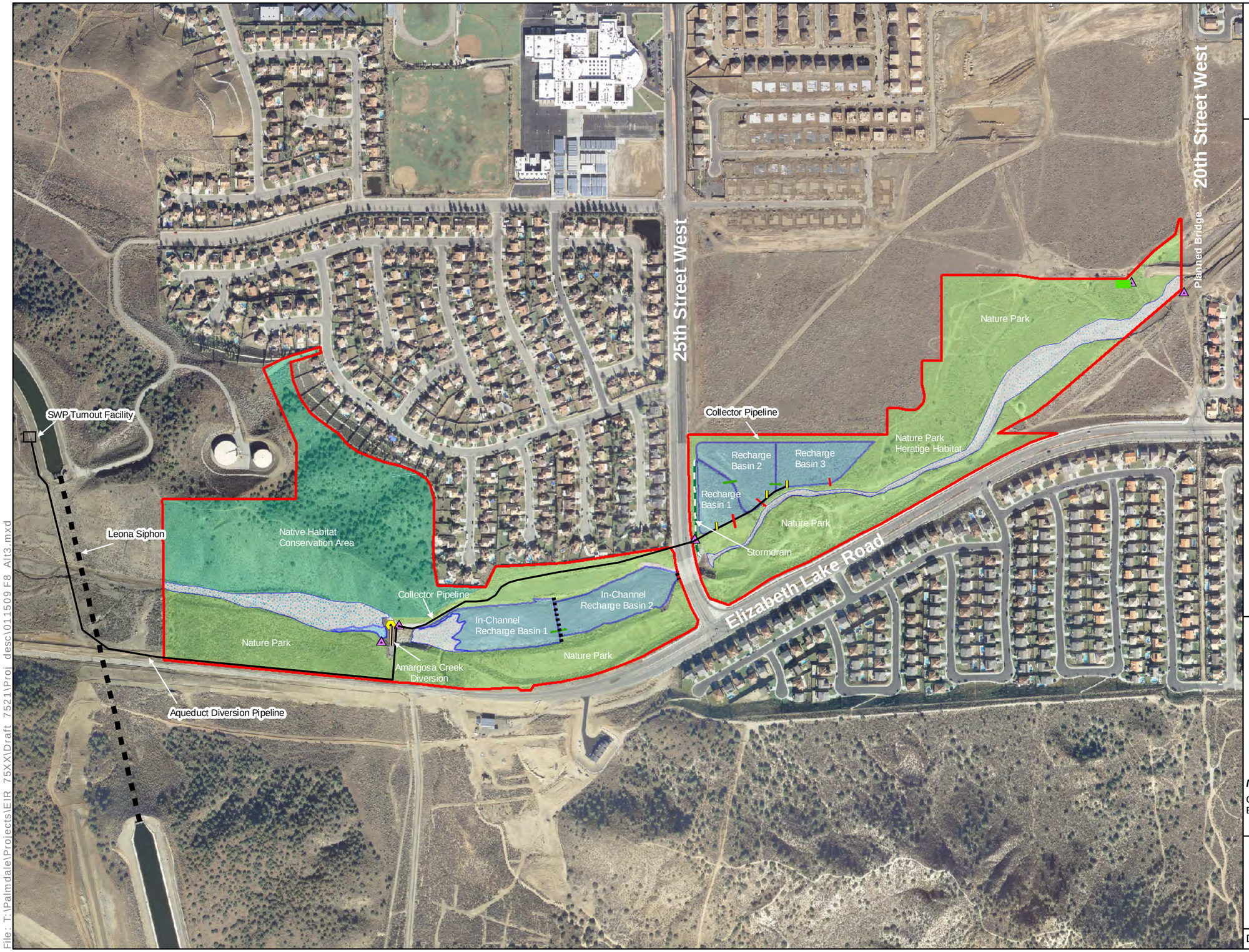
Upper Amargosa Project

Alternative 2
Removal of Off-Channel Recharge Basins



- Project Boundary (87 acres)
- Recharge Basin (11.6 acres)
- Nature Park (44.2 acres)
- Native Hab. Conserv. (22 acres)
- Open Stream Channel (7 acres)
- Push-Up Dam
- Conveyance Pipe
- Storm Drain with Outlet Structure
- Basin Inlet Pipe/Valve with Flow Measurement
- Interpond Pipe/Gate/Weir with Flow Measurement
- Return Flow Pipe/Gate/Weir with Outlet Protection/Flow Measurement
- Stream Diversion Intake Structure/Headgate
- Flow Measurement Device

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FIGURE: 2-7

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Upper Amargosa Project

Alternative 4
Alternative Aqueduct Diversion Pipeline Alignments

- Project Boundary (87 acres)
- Recharge Basin (20 acres)
- Nature Park (38 acres)
- Native Hab. Conserv. (22 acres)
- Open Stream Channel (7 acres)
- Push-Up Dam
- Conveyance Pipe
- Storm Drain with Outlet Structure
- Basin Inlet Pipe/Valve with Flow Measurement
- Interpond Pipe/Gate/Weir with Flow Measurement
- Return Flow Pipe/Gate/Weir with Outlet Protection/Flow Measurement
- Stream Diversion Intake Structure/Headgate
- Flow Measurement Device

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Feet

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NOTES:

Coord Sys: State Plane NAD 83 Zone 5 U.S. Foot
Basemap: LARIAC 4-in resolution Airphoto, 2006

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FIGURE: 2-8

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2.6.2.3.1 Alignment A: North Side of Amargosa Creek

The Aqueduct Diversion Pipeline would be a 36-inch pipeline buried in the ground from the proposed SWP Turnout Facility. It would be installed in a trench parallel to the Leona Siphon for approximately 600 feet as it drops in elevation from the SWP Turnout Facility to the valley floor. At Amargosa Creek, the pipeline would turn east and be trenched into the hillside approximately 10 feet above the stream channel. The pipeline would parallel Amargosa Creek along the hillside for approximately 1,700 feet. The pipeline would then connect to a pressure reducing assembly which would be attached to the 52-inch, Collector Pipeline at the Amargosa Creek Diversion structure. The south-facing slope on the north bank of Amargosa Creek is largely solid bedrock. This alternative would require trenching into the bedrock formation. The pipeline would be 675 feet shorter than the route for the proposed project.

2.6.2.3.2 Alignment B: Buried in Amargosa Creek Stream Channel

The Aqueduct Diversion Pipeline would be a 36-inch pipeline buried in the ground from the proposed SWP Turnout Facility. It would be installed in a trench parallel to the Leona Siphon for approximately 600 feet as it drops in elevation from the SWP Turnout Facility to the valley floor. At Amargosa Creek, the pipeline would turn east and be buried in the Amargosa Creek stream channel for approximately 1,600 feet and approximately 10 to 15 feet deep. The terminus of the pipeline would connect to a pressure reducing assembly which would be attached to the 52-inch, Collector Pipeline at the Amargosa Creek Diversion structure. The pipeline length from the SWP Turnout Facility to the Diversion Structure would be 775 feet shorter than the route for the proposed project.

The Amargosa stream channel is typically dry with only occasional flows throughout the year. Placement of the pipeline in the stream channel would reduce impacts to sensitive habitats on the stream terrace.

2.6.2.4 Alternative 4: No Project Alternative

As directed under CEQA Guidelines Section 15126.6, the No Project Alternative assumes the reasonable future development of the project site assuming the proposed application were not approved, given currently available public services infrastructure. The current site is zoned single family residential. Barring a change in that zoning, the site could be developed as residential with a minimum 7,000 square foot lot size.

There are constrains as to the number of residential units that could be constructed. Homes could not be constructed in the stream channel or the flood plain immediately adjacent to the channel. Approximately 50 acres of the 87 acre site are reasonably level, above the flood plain, and therefore assumed to be potentially suitable for residential housing. Assuming ten percent of the 50 acres would be allocated to streets, a maximum of 280 units could be built on potentially buildable lots within the site boundary. Streets and electric power, gas, sewer service, and water would need to be installed so support the development. Approximately 50 acres of grading would be required and trenching for utilities and services would also need to occur.

3 Environmental Setting and Impact Analysis

This EIR discusses all environmental resources potentially impacted by the project as required by CEQA. The City issued a Notice of Preparation/Initial Study (NOP/IS) for the UAP on September 11, 2008. The NOP/IS described the Project and the environmental review process and identified the environmental issues to be addressed in the EIR. Impacts on the following environmental issue areas were determined by the City of Palmdale in the Initial Study as warranting detailed evaluation in this EIR:

- Aesthetics/Visual Resources;
- Air Quality;
- Biological Resources;
- Cultural Resources;
- Geology and Soils;
- Hazards and Hazardous Materials;
- Hydrology and Water Quality;
- Land Use;
- Noise; and
- Transportation/Circulation.

These environmental resource impact assessments are discussed in the following sections. In cases where the potential for significant adverse environmental effects are identified, mitigation measures are proposed to avoid, minimize, and/or provide compensatory replacement of the resources that would be negatively impacted.

In addition to these primary environmental concerns, the EIR addresses those potential impacts on environmental issue areas considered to be adverse, but less than significant, as required under CEQA Guidelines Section 15126. These issue areas are

- Public services;
- Recreation; and
- Utilities/service systems.

In each of the following sections, which are arranged by issue area, the environmental setting is described followed by a discussion of the criteria used to determine impacts and the methodologies employed to make those determinations. Thereafter, the impacts of the proposed project and the alternatives considered are also discussed.

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3.1 Aesthetics/Visual Resources

This section evaluates the potential impacts on visual resources associated with the proposed project, including the project's effects on visual character, visual quality, and viewing audience, as well as the potential for project-generated glare.

3.1.1 Environmental Setting

3.1.1.1 Area of Influence

The area of influence for consideration of the project's effects on aesthetics/ visual resources is the portion of the project site and adjacent environment that is observed from public view corridors. Public views include those experienced while stationary (i.e., observed from recreational facilities such as parks and open space areas, and scenic vista points), or while mobile (i.e., traveling on public roads; running or walking on sidewalks or paths). Examples of private views that are not considered in this analysis are from individual residential yards or patios, and private commercial establishments, including visitor serving facilities.

3.1.1.2 Setting

3.1.1.2.1 Visual Resources

Visual resources are generally defined as the natural and built features of the landscape visible from public views that contribute to an area's visual quality. This section describes the existing visual environment and changes resulting from the proposed project in order to characterize the aesthetic condition of the Project site, including on-site structures and facilities, and assess how the condition would be potentially affected by implementation of the proposed project.

The evaluation of visual resources in the context of environmental analysis typically addresses contrast between visible landscape elements. Collectively, these elements comprise the aesthetic environment, or landscape character. The landscape character is compared to the proposed project's visual qualities to determine the compatibility or contrast resulting from the buildout of the proposed action.

Views are defined as visual access to, or visibility of, a natural or built landscape feature from an observer viewpoint. Views may be focal (restricted in scope to a particular object), or panoramic (encompassing a large geographic area with a wide or deep [i.e., distant] field of view). Focal views can be from a number of observer viewpoints compared to the object being viewed: from a lower elevation; at the same level; or from an elevated vantage. Panoramic views are usually associated with an elevated observer viewpoint. Scenic views or vistas are panoramic public views that include natural features including views of the ocean, unusual topographic features, or unique urban or historic structures.

Views are characterized by their distance from the viewer: foreground; middle-ground; or background. Foreground views are those immediately perceived by the viewer and include objects at close range that tend to dominate the view. Middle-ground views occupy the center of the view and generally include objects that are the center of a viewer's attention if they are sufficiently large or visually contrasting with adjacent visual features. Background views include distant objects and other objects that form the horizon. Objects perceived in the background view eventually diminish in their importance with increasing distance. In the context of the background, the skyline can be an important visual context because objects above this point are highlighted against the typically blue background.

A viewshed, or visible area, is the total range of views experienced from an observer's viewpoint. A viewshed is defined by landscape features that define or obstruct sightlines, or the line of sight between an observer and

a viewed object. Views may be partially or entirely obstructed by topography, buildings and structures, and/or vegetation. The closer an intervening obstruction is to the observer, the more it will potentially obstruct the viewshed. Accordingly, a small physical obstruction in the foreground of a view will potentially have a more substantial affect on the viewshed compared to a relatively large obstruction perceived in the middle or background.

3.1.1.2.2 Glare

Glare, an indirectly caused phenomenon of lighting or reflection off building materials, can cause a negative impact during the day or night. Daytime glare is caused by the reflection of sunlight from highly reflective surfaces. Reflective surfaces are generally associated with buildings constructed with broad expanses of highly polished or smooth surfaces (e.g., glass or metal) or broad, light-colored paving surfaces such as concrete. Nighttime glare can include direct, intense, focused light, as well as reflected light. Glare can be caused by mobile, transitory sources such as automobiles, or from intense stationary sources including security lighting.

3.1.1.2.3 Visual Character of the Site and Surroundings

Palmdale's foothill location affords views of the Antelope Valley, the Tehachapi, and San Gabriel Mountains, and desert buttes and playas. Its topography includes rolling hillsides, steep slopes, and flatland. Dominant vegetation includes juniper/Joshua scrublands, remnant orchards, and riparian habitat. Frequent wide vistas offer a sense of space and openness.

The project site is located on the north side of Elizabeth Lake Road. Amargosa Creek transverses the project site. The site encompasses varying topography, including an active stream channel (Amargosa Creek), riparian terraces, and the north- and south-facing slopes of a hillside, with on-site elevation ranging between approximately 2,700 and 2,900 feet. The site is currently undeveloped with portions of the property previously cleared of vegetation and otherwise disturbed by human activities. Existing features include a sewer line with manhole covers, outflows from storm water culvers, the Elizabeth Lake Road embankment, unimproved roads, paths, and bladed areas. A considerable accumulation of refuse and debris is littering the site because of these previous uses. The vegetation in the project area is primarily composed of various desert or semi-desert scrub communities including mature upland desert scrub. The project site contains a variety of important scenic resources including undulating topography, hillsides, and desert vegetation (e.g., Joshua trees and California juniper). The native habitat conservation area in the northwestern portion of the project site includes a very steep south-facing slope adjacent to Amargosa Creek with a gentler north-facing slope. This area is protected by the City of Palmdale Hillside Management Ordinance and is considered a sensitive scenic resource.

Surrounding urban residential development exist to the north, south, east, and west of the site. These developments are primarily one- and two-story single family residences and have architectural styles of Rural Cottage, Contemporary Shingle, and Contemporary American West. Partially developed and undeveloped portions of the planned City Ranch residential community exist to the south of the project site. The Desert View Highland residential community is south east of the project site within the County of Los Angeles. Adjacent areas to the west consist of existing and planned medium and low-density residential development. Single family residential uses also exist to the north and east of the project site. Adjacent open space areas associated with undeveloped land consist of riparian habitats, ephemeral drainages, and undulating topography. This contiguous open space adjacent to the City's urban area is an important visual resource.

3.1.1.2.4 Project Site Views from Public Roadways

The project site is highly visible from adjacent public roadways, including Elizabeth Lake Road, 25th Street West/Highland Avenue, and 20th Street West (see Figure 3.1-1). None of these roads are State Scenic highways. However, Elizabeth Lake Road is designated as a City scenic highway because it possesses scenic qualities that provide outdoor recreation experience to travelers and hikers (City of Palmdale 1993). The proposed project is adjacent to and is visible from Elizabeth Lake Road. This road historically has been a two-lane east-west roadway. However, portions of the road adjacent to the project site were recently widened to four lanes, and widening continues west of the site.

Prominent foreground views of open space, Amargosa Creek, undulating hillsides, and residential development are experienced from all adjacent roadways. Prominent background views are of undulating hillside topography and residential development are experienced from Elizabeth Lake Road, 25th Street West/Highland Avenue, and 20th Street West; distant background views of the Ritter Ridge and Sierra Pelona and San Gabriel Mountains and residential development are experienced from Elizabeth Lake Road and 25th Street West/Highland Avenue. Distant background views of the Sierra Pelona and San Gabriel Mountains and residential development are visible from 20th Street West. The distant foothills and significant ridgelines of the Sierra Pelona and San Gabriel Mountains, south of the project site, form the City's skyline views and are visible across the project site from 25th Street West/Highland Avenue, and 20th Street West. These lands provide a visually important scenic background to the Palmdale area.

The duration of project site views experienced by motorists traveling along Elizabeth Lake Road at 45 miles per hour would be approximately 90 seconds and along 25th Street West/Highland Avenue at 45 miles per hour (the posted speed limit) are considerably shorter. Bicyclists and pedestrians would experience views of the project site along this roadway for considerably longer.

Open Space and Physical Attributes

Important viewpoints within the project viewshed are illustrated in Figure 3.1-1. Nine representative views of the project site are presented in Figures 3.1-2 through 3.1-4. Each of the views is from prominent public roadways; west from Elizabeth Lake Road (Views 1 and 6); east from Elizabeth Lake Road (View 2); northwest from Elizabeth Lake Road (View 3); northeast from Elizabeth Lake Road (View 4 and 5); southwest from 25th Street West/Highland Avenue (View 7); west from 25th Street West/Highland Avenue (View 8); and southwest from 20th Street West (View 9). The nine views present four near-distant views of the site (Views 1,2, 3, 4, and 5) and three long-distance panoramas of the site (Views 6, 7, 8 and 9) from adjacent public vantage points. They are considered representative of the views that encompass important visual characteristics of the project site and surrounding areas.

Elizabeth Lake Road: Individuals traveling eastbound on Elizabeth Lake Road looking eastward in the vicinity of the project site experience foreground views of open space, Amargosa Creek, undulating hillside topography, and residential development. Undulating hillside topography, residential development, and Amargosa Creek are visible in the background, with distant background views of the Sierra Palona and San Gabriel Mountains, Amargosa Creek, and residential development (See Figure 3.1-2, Views 2, 4, and 5). Motorists traveling westbound on Elizabeth Lake Road experience foreground views of Amargosa Creek, residential development, and undulating hillside topography (Figure 3.1-2, Views 1, 3, and 6); distant background views of the Ritter Ridge and the Sierra Pelona and San Gabriel Mountains (Figure 3.1-2, Views 1, 3, and 6).

25th Street West/Highland Avenue: Views from 25th Street West/Highland Avenue looking southwest provide foreground views of Amargosa Creek; Elizabeth Lake Road is visible in the background beyond the project site, and undulating hillsides are visible in the distant background (Figure 3.1-3, View 7).

Figure 3.1-1. Location of Viewpoints

View 1. Looking west from Elizabeth Lake Road

View 2. Looking east from Elizabeth Lake Road

View 3. View northwest from Elizabeth Lake Road

Figure 3.1-2. Views 1, 2, and 3: Looking from Elizabeth Lake Road

View 4. View northeast from Elizabeth Lake Road

View 5. View northeast from Elizabeth Lake Road

View 6. View west from Elizabeth Lake Road

Figure 3.1-2. Views 4, 5, and 6: Looking from Elizabeth Lake Road

View 7. Looking southwest from 25th Street/Highland Avenue

View 8. Looking west from 25th Street/Highland Avenue

Figure 3.1-3. Views 7 and 8: Looking from 25th Street West/Highland Avenue

View 9. Looking west from 20th Street

Figure 3.1-4. View 9: Looking West from 20th Street

Views from 25th Street West/Highland Avenue looking west provide foreground vistas of Amargosa Creek; undulating hillsides are visible in the middle ground with Elizabeth Lake Road visible to the south of the project site and residential development to the north (See Figure 3.1-3, View 8). The foothills of the Sierra Pelonas are visible in the distant background (Figure 3.1-3, View 8).

20th Street West: Views from 20th Street West looking west provide an expansive foreground view of Amargosa Creek. Residential development and a hillside with a water tank are visible in the background beyond the project site with undulating ridgelines of the Sierra Pelona foothills prominent in the distant background (Figure 3.1-4, View 9).

Residential Development (North of Project Site): Looking southwest from public roadways adjacent to the existing residential development north of the project site (Figure 3.1-2, View 7), existing residences are visible in the foreground with distant background views of the Sierra Pelona Mountains partially obstructed by the intervening residences.

Residential Development (South of Project Site): Looking west (Figure 3.1-2, View 6) from Elizabeth Road across the street from residential development south of the project site, expansive views of Amargosa Creek are visible in the foreground, with background views of residential development and undulating hillsides and distant background views of Ritter Ridge and the Sierra Pelona Mountains visible beyond the project site. Looking northeast (Figure 3.1-2, View 5) expansive views of Amargosa Creek are visible in the foreground, with background views of residential development.

In summary, existing public views of the project site and surrounding lands contain several important physical visual attributes: Amargosa Creek, undulating hillsides, and the Sierra Pelona and San Gabriel Mountains serving as a background. The Amargosa Creek, hillsides, and the undeveloped/open space land use of the project site is a dominant visual character. The combination of these features from several public roadways enhances the visual quality of the project site.

Night Lighting and Glare

Manmade sources of light can create lighting in unintended locations (for instance, parking lot lighting may spill onto adjacent properties or street lighting may shine into the windows of adjacent residences), and light can detract from the darkness of the night sky, creating a corona effect and unwanted sky glow.

Within the project site and surrounding areas, existing light sources are primarily associated with residential lighting (including parking areas), street lighting, and intermittent lighting from vehicle headlights. Recent and planned residential development north and south of the project site continues to increase the amount of night lighting within the area resulting in increased corona effect and diminished quality of the night sky within these areas and more rural adjacent areas from which views of the night sky are affected by such lighting. Existing light sources within the project site are limited to minimal street lighting and represent an insignificant source of light. No substantial light sources exist along Elizabeth Lake Road or at locations where other off-site infrastructure is provided.

3.1.1.3 Regulatory Setting

Local and regional adopted plans and policies within the City of Palmdale General Plan provide the primary regulatory guidance for maintaining aesthetic resources in the project area, although state agencies have also adopted plans that determine allowable changes to visual resources within their jurisdiction (e.g., CalTrans). Areas considered to have the greatest visual sensitivity are typically along scenic highways or other natural areas. The primary areas of concern generally result from changes to prominent topographic features,

changes in the character of an area with high visual sensitivity, removal of important vegetation, or obstructing public views of a visually sensitive landscape.

3.1.1.3.1 State

California's Scenic Highway Program was created to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways (Streets and Highways Code §260 *et seq*). There are no officially state-designated scenic highways within or in the vicinity of the project area.

3.1.1.3.2 Local

City of Palmdale General Plan- Community Design Element

The City of Palmdale General Plan, Community Design Element, contains goals and objectives relevant to visual resources that guide private development, government actions, and programs within the City. Additionally, the Community Design Element contains policies to shape the City's overall form and appearance and to protect the City's scenic resources. These goals, objectives, and policies are intended to serve as long-term principles and policy statements.

City of Palmdale General Plan- Environmental Resources Element

The City of Palmdale General Plan, Environmental Resources Element, contains goals and objectives relevant to conservation and open space and contains policies concerning air, water, land open space, recreation, and energy resources that relate to their conservation, preservation, and managed use. The element is divided into four major issue areas: open space, conservation, outdoor amenities, and scenic highways. These goals, objectives, and policies are intended to serve as long-term principles and policy statements.

The scenic highways portion of the Environmental Resources Element designates Elizabeth Lake Road as a City scenic highway. Elizabeth Lake Road is located directly adjacent and to the south of the proposed project site.

3.1.2 Impacts and Mitigation Measures

3.1.2.1 Methodology

The assessment of aesthetic impacts involves qualitative analysis that is inherently subjective in nature. Different viewers may have varying opinions and reactions to changes in a viewshed or the appearance of new buildings and structures. This assessment of visual resources is based on evaluation of the physical attributes of the project site, its relative visibility, and its relative uniqueness. The potential impact for a project to affect on-site and surrounding visual character and qualities is based on the assessment of the visual character of project features compared to the project setting. This evaluation compares the existing visual characteristics of the project study area against the potential changes in visual characteristics that could result from implementation of the proposed project.

3.1.2.2 Significance Criteria

Consistent with guidance provided in CEQA Guidelines *Appendix G* Environmental Checklist Form, the proposed project would result in a significant visual impact if it would result in one or more of the following conditions:

AES-1: Obstruct an important visual resource or view;

AES-2: Substantially degrade the existing visual character or quality of the site and its surroundings; or

AES-3: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

A review of the project application has determined that project development would not result in the exceedance of the following threshold criterion, and therefore is not discussed further:

- Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
    - *As surrounding roadways, including Elizabeth Lake Road and 25th Street/Highland Street are not classified as state scenic highways, the project would not create significant impacts on scenic resources within a scenic highway.*

3.1.2.3 Proposed Project

Impact AES-1: The proposed project would not obstruct an important visual resource or view.

Visually important resources and views in the project vicinity include background views of hillsides and the Sierra Pelona and San Gabriel Mountains, and open space as experienced from Elizabeth Lake Road.

The proposed project would result in the 87 acres of undeveloped land being modified to a recharge facility (20 acres), community nature park (28 acres); native habitat conservation area (32 acres); and stream channel (7 acres).

The 28-acre nature park would be located adjacent to the northern edge of Elizabeth Lake Road and would preserve and enhance native vegetation and would provide walking and bike pathways, picnic facilities, covered benches (maximum height of 10 feet), and interpretive displays. A conceptual drawing of the nature park and associated facilities is provided in Figure 2-5. This portion of the project would not alter or obstruct existing ridgelines and would be visually compatible with surrounding vegetation. The nature park area would be visible from Elizabeth Lake Road. However, features associated with the nature park would enhance the existing views from these scenic vistas by replacing degraded landscapes with natural vegetation. Thus, the proposed nature park would not obstruct views of hillsides and the Sierra Pelona and San Gabriel Mountains nor would it obstruct open space as experienced from Elizabeth Lake Road. Rather, it would enhance the aesthetic quality of the open space as experienced from Elizabeth Lake Road and thus would result in a beneficial effect.

Beyond the nature park to the north, the recharge facility would consist of six off-channel basins. Construction of the recharge basins would involve recontouring of site soils to form earthen berms that could be as tall as five feet above ground level. Construction of the recharge basins would not obstruct views of hillsides and the Sierra Pelona and San Gabriel Mountains nor would it obstruct open space as experienced from Elizabeth Lake Road..

The 32-acre native habitat conservation area, in the northwest portion of the site would be minimally restored and a portion of an existing path along the ridge on the north side of the creek may be improved to minimize ongoing erosion and improving access to existing regional pedestrian trail. This portion of the project would not alter existing ridgelines and would be visually compatible with surrounding vegetation. Additionally, project development is planned in a manner that substantially retains the visual qualities and natural elevations of the significant ridgelines and prominent landforms forming the City's skyline backdrop and

preserves those portions of the ridgelines visible from the Antelope Valley floor, or adjacent valleys, as a scenic skyline backdrop to the City. Additionally, the project would not obstruct views of hillsides and the Sierra Pelona and San Gabriel Mountains nor would it obstruct open space as experienced from Elizabeth Lake Road. Thus, the habitat conservation area would not obstruct an important visual resource or view; rather, it would result in a beneficial effect.

Mitigation Measures

As the project's impact on important visual resources or views would be less significant, no mitigation measures are required.

Significance of Impacts After Mitigation

The residual impact on aesthetic and visual resources related to important visual resources and views would be less than significant. Restoration of native vegetation in the Nature Park area would be a beneficial impact.

Impact AES-2: The proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings.

The project site is currently undeveloped land located within the Palmdale urban boundary adjacent to existing urban development. The proposed project would change the visual character from open space to public facilities, with open space and passive recreational facilities. This change in land use would not be a substantial degradation in the existing visual character. The impact on visual resources would be less than significant.

Construction of the recharge basins would introduce a new contrasting element into the landscape that could degrade the existing character or quality of the site and its surroundings. Construction of the proposed project would result in short-term impacts to the existing visual character or quality of the site and its surroundings. Construction activities would require the use of heavy equipment and storage of materials on-site. During construction, excavated areas, stockpiled soils, and other materials, and litter at the construction site and staging areas would constitute negative aesthetic elements in the visual landscape. These negative aesthetic elements would directly affect scenic vistas as viewed from a scenic highway, Elizabeth Lake Road, designated by the Palmdale General Plan. However, these effects would be temporary during project construction and would not significantly impact the long-term visual character of the area.

Mitigation Measures

As the project's impact on existing visual character or quality of the site and its surroundings would be less significant, no mitigation measures are required.

Significance of Impacts After Mitigation

Less than significant impacts on aesthetic and visual resources associated with the visual character or quality of the site and its surroundings would occur.

Impact AES-3: The proposed project would not create new sources of substantial light or glare which would adversely affect day or nighttime views in the area.

The project would include lighting, in the form of low, profile solar lights, to illuminate the multi-use path and park amenities such as the ramadas. As these lighting devises are intended to collect solar energy rather than reflect it, their surfaces would not create additional daytime on-site glare. In addition, the lighting would

be comprised of low energy fixtures and would focus the light only on desired facility areas, thus limiting the extent to which new lighting would affect nighttime views in surrounding areas beyond the project site. Thus, the proposed project would not introduce a substantial amount of new night light and glare, or significant change in the level of night light illumination when compared to what is presently generated over the project site. As such, impacts on aesthetic/visual resources would be less than significant.

Mitigation Measures

As the project's impact on important day or nighttime views would be less significant, no mitigation measures are required.

Significance of Impacts After Mitigation

Less than significant impacts on aesthetic and visual resources associated with the light or glare would occur.

3.1.2.4 Alternative 1 – No In-Channel Recharge Basin

The No In-Channel Recharge Basin Alternative would eliminate aesthetic/visual impacts associated with the in-channel recharge basins located west of 25th Street West/Highland Avenue and north of Elizabeth Lake Road. This alternative would involve the same construction and operation of facilities as the proposed project with the exception of the in-channel recharge basins. As such, impacts on aesthetics/visual resources would be similar in nature to, but slightly less than those described for the project. As with the proposed project, implementation of this alternative would result in less than significant impacts on aesthetics/visual resources with the implementation of Mitigation Measures AES-2.1 and AES-3.1. Overall, the visual impacts of the No In-Channel Recharge Basin would be similar to the proposed project although somewhat lower because of the lack of in-channel basins.

3.1.2.5 Alternative 2 – Reduced Off-Channel Recharge Basin

The Reduced Off-Channel Recharge Basin Alternative would eliminate three off-channel basins in the eastern portion of the project site and instead restore the unused areas as native habitat. This alternative would involve the same construction and operation of facilities as the proposed project with the exception of the three off-channel recharge basins, which would reduce construction time somewhat. This alternative would reduce aesthetic/visual impacts associated with the construction and operation of these three recharge basins. Additionally, the restoration of these areas would provide a beneficial aesthetic/visual impact. Thus, impacts on aesthetics/visual resources would be similar in nature to, but less than those described under the proposed project. As with the project, implementation of this alternative would result in less than significant impacts on aesthetics/visual resources with the implementation of AES-3.1.

3.1.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

The Alternative Aqueduct Diversion Pipeline Alignments Alternative would change the location and the length of the aqueduct diversion pipeline. This alternative would involve the same construction and operation of facilities as the proposed project; however construction would occur over a shorter distance because of the reduced pipeline length. Although development under this alternative would reconfigure the size and location of the aqueduct diversion pipeline, impacts on visual/aesthetic resources would be generally equivalent to the proposed project. As with the project, implementation of this alternative would result in less than significant impacts on aesthetics/visual resources with the implementation of Mitigation Measures AES-3.1.

3.1.2.7 Alternative 4 – No Project Alternative

Given existing zoning, the No Project Alternative would involve the construction of approximately 280 residential units on lots of 7,000 square feet or greater. This would involve installation of streets, utilities, and construction of houses on areas above the flood plain of Amargosa Creek. The visual impact of a residential community of 280 houses would be a substantial adverse change from the undeveloped appearance of the site today. In addition, the future visual effect of the site would be improved by the removal of trash and non-native vegetation and the planting and enhancement of native habitats on areas of the site not involved directly in the recharge basins. Therefore, the No Project Alternative would result in a significant adverse aesthetic and visual resources impact and would be substantially less aesthetically appealing than the proposed project. The impact of the No Project Alternative would be unavoidable and significant not being subject to mitigation to less than significant levels.

3.1.3 Mitigation Measures and Monitoring Program

As no mitigation measures are required to address impacts on aesthetic and visual resources, no mitigation monitoring program is required.

3.2 Air Quality

3.2.1 Environmental Setting

The project site is located in the southern region of Antelope Valley in the City of Palmdale within the Mojave Desert Air Basin (MDAB). The MDAB encompasses about 21,480 square miles and includes the desert portions of San Bernardino County, Riverside County, Palo Verde Valley, and the cities of Palmdale and Lancaster in the Antelope Valley. The MDAB is an assemblage of mountain ranges interspersed with long broad valleys that contain dry lakes. The MDAB is bordered by the South Coast Air Basin (SCAB) to the southwest, the Salton Sea Air Basin to the south, the Great Basin Unified Air Basin to the north, and the Arizona and Nevada borders to the east. The project site is located within the Antelope Valley Air Quality Management District (AVAQMD).

3.2.1.1 Regional Climate and Meteorology

The climate of the project region is typical of a desert environment. The surrounding mountains block cool, moist coastal air and create hot, dry summers and cool winters. On average, 20 to 30 frontal systems move into the MDAB each winter but only a few of those produce measurable precipitation. The major influence on the regional climate is the Eastern Pacific High (a strong persistent area of high atmospheric pressure over the Pacific Ocean).

The average high and low temperatures in Palmdale in August are 97°F (36°C) and 65°F (18°C), respectively. January average high and low temperatures are 59°F (15°C) and 34°F (1°C). Extreme high and low temperatures recorded from 1963 through 1997 were 112°F (44°C) and 6°F (-14°C), respectively.

The inversion conditions in the MDAB do not foster the build-up of high ozone concentrations as often occurs in the coastal areas of Southern California. When inversions occur, they are generally 6,000 to 8,000 feet above the desert surface allowing much greater vertical mixing than along the coast where the inversion base is much lower (sometimes only hundreds of feet). As a result, meteorology in the MDAB is less conducive to the chemical mixing characteristic of typical ozone formation in the coastal regions.

3.2.1.2 Air Pollutants and Air Monitoring

3.2.1.2.1 Criteria Pollutants

Air quality at a given location can be described by the concentrations of various air pollutants in the atmosphere. The significance of a pollutant concentration is determined by comparing the pollutant's concentration to an appropriate national and/or state ambient air quality standard (AAQS). These standards represent the allowable atmospheric concentrations at which the public health and welfare are protected and include a margin of safety to protect the more sensitive individuals in the population.

The EPA establishes the National Ambient Air Quality Standards (NAAQS) that regulate the following criteria pollutants: ozone (O_3); carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); particulate matter less than 10 microns in diameter (PM_{10}); particulate matter less than 2.5 microns in diameter ($PM_{2.5}$); and lead. Specifically, for a region to be considered in attainment of standards, regulations mandate that maximum pollutant concentrations measured in a region generally shall not exceed a short-term NAAQS more than once per year and they shall not exceed the annual standards to be considered an attainment area. The state standards, established by the California Air Resources Board (CARB), are termed the California Ambient Air Quality Standards (CAAQS). California standards for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ are values not to be exceeded. All other standards are not to be equaled or exceeded. The NAAQS (EPA 2008) and CAAQS (CARB 2008) are presented in Table 3.2-1.

Table 3.2-1. California and National Ambient Air Quality Standards

Pollutant	*Averaging Time*	*California Standards* [a,c]	*----National Standards* [b]*----*	
			Primary [c,d]	**Secondary** [c,e]
Ozone (O_3)	1-hour	0.09 ppm (180 µg/m^3)	---	Same as primary
	8-hour	0.07 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	
Carbon monoxide (CO)	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	---
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	---
Nitrogen dioxide (NO_2)	Annual	0.03 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary
	1-hour	0.18 ppm (339 µg/m^3)	---	---
Sulfur dioxide (SO_2)	Annual	---	0.03 ppm (80 µg/m^3)	---
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	---
	3-hour	---	---	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	---	---
Respirable Particulate Matter (PM_{10})	Annual	20 µg/m^3 [f]	---	---
	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
Fine Particulate Matter ($PM_{2.5}$)	Annual	12 µg/m^3 [h]	15 µg/m^3 [i]	Same as primary
	24-hour	---	35 µg/m^3 [j]	Same as primary
Lead	30-day	1.5 µg/m^3	---	---
	Quarterly	---	1.5 µg/m^3	Same as primary
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	---	---
Sulfates	24-hour	25 µg/m^3	---	---
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m^3)	---	---
Visibility reducing particles [k]	8-hour (10 AM to 6 PM PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.	---	---

Notes:

a. California standards for O_3, CO, SO_2 (one hour), NO_2, PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. The standards for SO_2 (24-hour), sulfates, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.

b. National standards, other than O_3 and those based on annual averages, are not to be exceeded more than once a year. The O_3 standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

c. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibars). All measurements of air quality are to be corrected to these reference values; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

d. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

e. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

f. Measured as an arithmetic mean. New standard promulgated by CARB on June 20, 2002.

g. Measured as an arithmetic mean.

h. New standard promulgated by CARB on June 20, 2002.

i. Three-year average.

j. Three-year average of 95th percentile measurements.

k. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range when relative humidity is less than 70 percent.

l. 2008 ozone standard is effective 60 days after publication in the Federal Register.

The criteria pollutants of primary concern in this EIR include O_3, CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$.

Of the criteria pollutants of concern, O_3 is unique because it is not directly emitted from Project-related sources. Rather, ozone is a secondary pollutant formed from precursor pollutants that include volatile organic compounds (VOC) and nitrogen oxides (NO_x). VOC and NO_x react to form O_3 in the presence of sunlight through a complex series of photochemical reactions. As a result, unlike pollutants that do not react (inert pollutants), ozone levels usually peak several hours after the precursors are emitted and many miles downwind of the source as the chemical reactions in the surrounding atmosphere continue to produce ozone over time. Because of the complexity and uncertainty in predicting photochemical pollutant concentrations, ozone impacts are indirectly addressed by comparing project-generated emissions of VOC and NO_x to daily and annual emission thresholds set by the AVAQMD.

Diesel particulate matter (DPM) is a pollutant considered in this analysis, due to the prevalence of proposed diesel-powered construction equipment. The CARB classifies DPM as a Toxic Air Contaminant (TAC), although this study evaluates it as components of ambient PM_{10} and $PM_{2.5}$. This is appropriate, as the short-term nature of construction activities and its associated low rate of DPM emissions would produce minimal impacts to public health.

3.2.1.2.2 Secondary $PM_{2.5}$ Formation

Primary particles are emitted directly into the atmosphere by fossil fuel combustion sources, wind blown soil, and dust. Secondary $PM_{2.5}$ forms in the atmosphere by complex reactions of precursor emissions of gaseous pollutants, such as NO_x, SO_x, VOC, and ammonia (SCAQMD et al 2006). Secondary $PM_{2.5}$ includes sulfates, nitrates, and complex carbon compounds.

Project-generated emissions of NO_x, SO_x, and VOC would contribute to secondary $PM_{2.5}$ formation some distance downwind of the emission sources. However, since it is hard to predict secondary $PM_{2.5}$ formation from an individual project, the air quality analysis in this document focuses on the effects of direct $PM_{2.5}$ emissions generated by the project.

3.2.1.2.3 Ultrafine Particles

Traditionally, health concerns and air quality standards for particulates have focused on respirable particulate matter (i.e., PM_{10}) and fine particulate matter (i.e., $PM_{2.5}$). However, recently there has been an increased level of interest in the smallest size fraction of particulate matter, referred to as ultrafine particles (UFP). UFP are generally defined as ambient air particles less than or equal to 0.1 μm in diameter (100 nanometers). Due to their small size, UFP generally contribute a small fraction of the ambient concentrations of either PM_{10} or $PM_{2.5}$ (it takes approximately 15,000 UFP to equal the mass of a single $PM_{2.5}$ particle, and 1,000,000 UFP to equal the mass of a single PM_{10} particle). However, UFP are very numerous, particularly in urban atmospheres – typical urban air contains 10,000 to 40,000 ultrafine particles/cm^3, while near highways there can be between 40,000 and 1,000,000 particles/cm^3. UFP are not routinely measured in the United States, and there are no regulatory standards that address this category.

In the urban environment, motor vehicles are a major source of UFP, and for that reason they are found in high numbers near highways. Measurements have shown that there is a sharp drop in UFP within 100 to 300 m downwind of freeways, due to particle growth as UFPs clump together in the atmosphere after they have been emitted from vehicles. Consequently, high particle concentrations are very localized and tend to exhibit large geographical and temporal variations.

The high numbers of UFP found in the environment, especially in areas such as highways, have recently raised concerns about their health effects. There are two primary reasons for these concerns: studies have

shown that smaller particles, which tend to absorb higher fractions of trace metals and organic compounds because of their relatively high surface area, can be inhaled and deposited deeper into the lungs than larger particles; and UFP can be more easily transported from the lungs into the body, potentially increasing exposure to these particles and contaminants adsorbed on the particles. However, information on UFP is limited at this time – it is an area of active research.

3.2.1.2.4 Toxic Air Contaminants

The CARB regulates a list of TACs in California, as determined from their exposure assessments and health effects assessments performed by the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA). TACs are compounds that are known or suspected to cause adverse long-term (cancer and chronic) and/or short-term (acute) health effects. Exposure to elevated PM concentrations also may cause a reduction in life span (i.e. premature death). The OEHHA develops guidelines to evaluate cancer and non-cancer effects from TAC exposure for a health risk assessment (HRA) and the Toxic "Hot Spots" Program (AB 2588), based on information available from published animal and human studies.

3.2.1.2.5 Atmospheric Deposition

The fallout of air pollutants to the surface of the earth is known as atmospheric deposition. Atmospheric deposition occurs in both wet and dry form. Wet deposition occurs in the form of precipitation or cloud water (fog) and is associated with the conversion in the atmosphere of directly emitted pollutants into secondary pollutants such as acids. Dry deposition occurs in the form of directly emitted pollutants or the conversion of gaseous pollutants into secondary PM. Atmospheric deposition can produce watershed acidification, aquatic toxic pollutant loading, deforestation, damage to building materials, and respiratory problems.

3.2.1.2.6 Greenhouse Gas Emissions

Gases that trap heat in the atmosphere are known as greenhouse gases (GHG). GHG are emitted by natural processes and human activities. Examples of GHG that are produced both by natural processes and industry include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

The accumulation of GHG in the atmosphere regulates the earth's temperature. Without natural GHG, the Earth's surface would be about 61°F cooler (Association of Environmental Processionals [AEP] 2007). However, emissions from fossil fuel combustion by humans have elevated the concentration of GHG in the atmosphere to above pre-industrial levels. Scientific evidence indicates a correlation between increasing global temperatures and climate change over the past century and higher human induced levels of GHG. These and other environmental changes have potentially negative environmental, economic, and social consequences around the globe.

There are no federal standards for GHG emissions. However, the United States Supreme Court recently ruled that the harms associated with climate change are serious and well recognized and that the EPA must regulate GHGs as pollutants. Further, unless the agency determines that GHG do not contribute to climate change, it must promulgate regulations for GHG emissions from new motor vehicles (*Massachusetts et al. Environmental Protection Agency* [case No. 05-1120], April 2, 2007). Despite the Supreme Court's decision, EPA has yet to regulate GHGs. Thus, the control of GHG has been regulated at the state level and is approached by setting emission reduction targets for existing sources of GHG, setting policies to promote renewable energy and increase energy efficiency, and developing statewide action plans.

California and 17 other states have set GHG emission targets. Executive Order S-3-05 and Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, promulgated targets to achieve reductions in

GHG to 1990 GHG levels by the year 2020. This target-setting approach allows progress to be made in addressing climate change, and is a forerunner to setting emission limits.

The GHG Protocol Initiative of the World Resources Institute (WRI) identifies six GHGs generated by human activity that are believed to be contributors to global warming (WRI and WBCSD 2007). These same GHG are identified in AB 32 and by the EPA: (1) CO_2; (2) CH_4; (3) N_2O; (4) hydrofluorocarbons (HFCs); (5) Perfluorocarbons (PFC); and (6) sulfur hexafluoride (SF_6).

GHG have varying amounts of global warming potential (GWP). The GWP is the tendency of a gas or aerosol to trap heat in the atmosphere. By convention, CO_2 is assigned a GWP of 1. In comparison, CH_4 (methane) has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. To account for their GWP, GHG emissions are often reported as a CO_2 equivalent (CO_2e). The CO_2e for a source is calculated by multiplying each GHG emission by its GWP, and adding the results together to produce a single, combined warming potential representing all GHG.

The project air quality analysis includes estimates of GHG emissions associated with the construction activities.

3.2.1.2.7 Local Air Monitoring Levels

The EPA designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. A nonattainment designation generally means that a primary NAAQS has been exceeded more than once per year in a given area. The CARB also designates areas of the state as either in attainment or nonattainment of the CAAQS. An area is in nonattainment if a CAAQS has been exceeded more than once in three years.

With respect to the NAAQS, the Antelope Valley is presently in "moderate" nonattainment for the eight-hour O_3 standard, "serious" nonattainment for PM_{10}, nonattainment for $PM_{2.5}$, and in attainment for SO_2. The CARB recently reclassified the Antelope Valley as in attainment for CO and the EPA followed suit with a reclassification to attainment of the federal CO attainment region in June 2007 (EPA 2007). The Antelope Valley was historically nonattainment for the NAAQS for NO_2. Due to a reduction in emissions caused by national emission standards for new vehicles and a state vehicle emissions testing program, the region has attained the NO_2 standard since 1991. As a result, in September 1998 the EPA re-designated the Antelope Valley to attainment of the NO_2 NAAQS and the region is now considered a maintenance area for NO_2.

With respect to the CAAQS, the Antelope Valley is presently classified as in "extreme" nonattainment for O_3 and nonattainment for PM_{10}. The Antelope Valley is in attainment of the CAAQS for CO, SO_2, NO_2, sulfates, and lead, and is unclassified for hydrogen sulfide, vinyl chloride, and visibility reducing particles.

Generally, concentrations of photochemical smog, or O_3, are highest during the summer months and coincide with the season of maximum solar radiation. Inert pollutant concentrations tend to be the greatest during the winter months and are a product of light wind conditions and surface-based temperature inversions that are more frequent during that time of year. These conditions limit atmospheric dispersion, trapping pollutants close to the ground. However, in the case of PM_{10} impacts from fugitive dust sources, maximum dust impacts may occur during high wind events and/or in proximity to man-made ground-disturbing activities, such as vehicular activities on roads and earth moving during construction activities.

The AVAQMD maintains monitoring stations within the Antelope Valley that monitor air quality and compliance with associated ambient standards. The closest station to the proposed project is Lancaster-43301 Division Street. The following pollutants are monitored at this station: ozone (O_3), carbon monoxide (CO),

nitrogen dioxide (NO_2) and particulate matter less than 10 and 2.5 microns (PM_{10} and $PM_{2.5}$). The monitoring data for the Lancaster-43301 Division Street Monitoring Station is presented in Table 3.2-2.

Table 3.2-2. Maximum Pollutant Concentrations Measured at the Lancaster-43301 Division Street (2005 – 2008)

Pollutant	*Averaging Period*	*National Standard*	*State Standard*	*Highest Monitored Concentration*			
				2005	**2006**	**2007**	**2008**
Ozone (ppm)	1-hour	n/a	0.09	0.127	0.132	0.118	0.116
	8-hour	0.075 [d]	0.07	0.103	0.105	0.101	0.102
CO (ppm)	1-hour	35	20	n/a	n/a	n/a	n/a
	8-hour	9	9	1.54	1.60	1.25	1.04
NO_2 (ppm)	1-hour	n/a	0.18	0.074	0.066	0.064	0.062
	Annual	0.053	0.03	0.015	0.015	0.015	0.013
SO_2 (ppm)	1-hour	n/a	0.25	n/a	n/a	n/a	n/a
	24-hour	0.14	0.04	n/a	n/a	n/a	n/a
	Annual	0.03	n/a	n/a	n/a	n/a	n/a
PM_{10} ($\mu g/m^3$)	24-hour	150	50	47	58	181	70
	Annual	n/a	20	25	26.9	30.2	25.8
$PM_{2.5}$ ($\mu g/m^3$)	24-hour	35	n/a	28	18	25	24
	Annual	15	12	8.9	7.4	8.0	n/a
Lead ($\mu g/m^3$)	30-day	n/a	1.5	n/a	n/a	n/a	n/a
	Calendar quarter	1.5	n/a	n/a	n/a	n/a	n/a
Sulfates ($\mu g/m^3$)	24-hour	n/a	25	n/a	n/a	n/a	n/a

Sources: CARB (http://www.arb.ca.gov/adam/welcome.html)
Note:
Exceedences of the standards are bolded.

3.2.1.2.8 Sensitive Receptors

The impact of air emissions on sensitive members of the population is a special concern. According to AVAQMD guidance, sensitive receptor land uses include residences, schools, daycare centers, playgrounds and medical facilities.

The proposed project site is directly adjacent to residences. The nearest elementary school, Cottonwood Elementary School, is located 0.25 miles north of the project site; the nearest daycare center, ABC Daycare Center, is located 4.8 miles north of the project site; the nearest playground is located at approximately 0.25 miles north of the project site and the nearest medical facility, The California Allergy-Asthma Medical Group, is located 3.5 miles northeast of the project site.

3.2.1.3 Regulatory Setting

Sources of air emissions in the Antelope Valley are regulated by the EPA, CARB, and AVAQMD. In addition, regional and local jurisdictions play a role in air quality management. The role of each regulatory agency is discussed below.

3.2.1.3.1 Federal Regulations

The Federal Clean Air Act (CAA) of 1969 and its subsequent amendments form the basis for the nation's air pollution control effort. The EPA is responsible for implementing most aspects of the CAA. Basic elements of the act include the NAAQS for major air pollutants, hazardous air pollutant standards, attainment plans, motor

vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.

The CAA delegates the enforcement of federal standards to the states. In California, the CARB is responsible for enforcing air pollution regulations. In the Antelope Valley, the AVAQMD has this responsibility.

State Implementation Plan

For areas that do not attain the NAAQS, the CAA requires the preparation of a State Implementation Plan (SIP), detailing how the State will attain the NAAQS within mandated timeframes. In response to this requirement, the AVAQMD has adopted State and Federal attainment plans for the region within its jurisdiction. The most recent such plan that was approved by USEPA is the AVAQMD 2008 Federal 8-Hour Ozone Attainment Plan.

The AVAQMD has reviewed and updated all elements of the ozone plan. The plan includes the following: latest planning assumptions regarding population, vehicle activity and industrial activity, all existing and forecast ozone precursor-producing activities and all information to allow general and transportation conformity findings to be made within the Antelope Valley.

Emission Standards for Nonroad Diesel Engines

The USEPA has established a series of cleaner emission standards for new off-road diesel engines culminating in the Tier 4 Final Rule of June 2004. The Tier 1, Tier 2, Tier 3, and Tier 4 standards require compliance with progressively more stringent emission standards. Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006 and the Tier 3 standards are being phased in from 2006 to 2008. The Tier 4 standards complement the latest 2007+ on-road heavy-duty engine standards by requiring 90 percent reduction in DPM and NO_x when compared against current emission levels. To meet these standards, engine manufacturers will produce new engines with advanced emissions control technologies similar to those already expected for on-road heavy duty diesel vehicles. The Tier 4 standards will be phased in starting with smaller engines in 2008 until all but the very largest diesel engines meet NO_x and PM standards in 2015.

Emission Standards for On-Road Trucks

To reduce emissions from on-road, heavy-duty diesel trucks, EPA established a series of cleaner emission standards for new engines, starting in 1988. The final and cleanest Tier 4 standards apply to engines manufactured in year 2007 (EPA 2000). Complete phase-in of the 2007 standards for new engines will be accomplished by 2010.

3.2.1.3.2 State Regulations and Agreements

California Clean Air Act

The CARB, which became part of the California Environmental Protection Agency (Cal-EPA) in 1991, is responsible for implementing the requirements of the federal CAA, regulating emissions from motor vehicles and consumer products, and implementing the California Clean Air Act of 1988 (CCAA). The CCAA outlines a program to attain the CAAQS for O_3, NO_2, SO_2, and CO by the earliest practical date. Since the CAAQS are more stringent than the NAAQS, attainment of the CAAQS will require more emission reductions than what will be required to show attainment of the NAAQS. Similar to the federal system, the state requirements and compliance dates are based on the severity of the ambient air quality standard violation within a region.

Heavy Duty Diesel Truck Idling Regulation

This CARB rule became effective in February 1, 2005 and prohibits heavy-duty diesel trucks from idling for longer than five minutes at a time, unless they are queuing, and provided the queue is located beyond 100 feet from any homes or schools (CARB 2006c).

California Diesel Fuel Regulations

In 2004, the CARB set limits on the sulfur content of diesel fuel sold in California for use in on-road and off-road motor vehicles (CARB 2004). Under this rule, diesel fuel used in motor vehicles except harbor craft and intrastate locomotives has been limited to 500-ppm sulfur. The sulfur limit was reduced to 15 ppm beginning on September 1, 2006. (The federal diesel rule similarly limited sulfur content nationwide for on-road vehicles to 15 ppm on October 15, 2006.)

Statewide Portable Equipment Registration Program (PERP)

The PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units (CARB 2005d). Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts, as long as the equipment is located at a single location for no more than 12 months.

AB 32 - California Global Warming Solutions Act of 2006

AB 32 was signed into law by Governor Schwarzenegger on September 27, 2006 and is the first law to comprehensively limit GHG emissions at the state level. The intent of the Act is to reduce California GHG emissions to 1990 levels by 2020. The Act instructs the CARB to adopt regulations that will reduce emissions from significant sources of GHG and establish a mandatory GHG reporting and verification program by January 1, 2008. AB 32 requires the CARB to adopt GHG emission limits and emission reduction measures by January 1, 2011, both of which are to become effective on January 1, 2012. AB 32 does not identify a significance level of GHG for CEQA purposes, nor has the CARB adopted such a significance threshold.

California Climate Action Registry (CCAR)

Established by the California Legislature in 2000, the California Climate Action Registry is a non-profit public-private partnership that maintains a voluntary registry for GHG emissions. The purpose of CCAR is to help companies, organizations, and local agencies establish GHG emissions baselines for purposes of complying with future GHG emission reduction requirements.

AB 32 requires the CARB to incorporate the standards and protocols developed by CCAR into the state's future GHG emissions reporting program, to the maximum extent feasible. The current GHG emission calculation methods used by CCAR are contained in *California Climate Action Registry—General Reporting Protocol,* Version 3.0, (CCAR 2008). This protocol categorizes GHG emission sources as either (1) direct (vehicles, on-site combustion, fugitive, and process emissions), or (2) indirect (from off-site electricity, steam, and co-generation).

3.2.1.3.3 Local Regulations and Agreements

Through the attainment planning process, the AVAQMD has developed *AVAQMD Rules and Regulations* to regulate sources of air pollution in the Antelope Valley. The most pertinent AVAQMD rules to the proposed project are listed below. The emission sources associated with the proposed project are considered mobile sources. Therefore, they are not subject to the AVAQMD rules that apply to stationary sources, such as

Regulation XIII (New Source Review), Rule 1401 (New Source Review of Toxic Air Contaminants), or Rule 431.2 (Sulfur Content of Liquid Fuels).

AVAQMD Rule 402 – Nuisance

This rule prohibits discharge of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any such persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property.

AVAQMD Rule 403 – Fugitive Dust

The purpose of this rule is to control the amount of PM entrained in the atmosphere from man-made sources of fugitive dust. The rule prohibits emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area to be visible beyond the emission source's property line. During project construction, best available control measures identified in the rule would be required to minimize fugitive dust emissions from proposed earth-moving and grading activities. These measures would include site watering as necessary to maintain sufficient soil moisture content. Additional requirements apply to operations on a property with 50 or more acres of disturbed surface area, or for any earth-moving operation with a daily earth-moving or throughput volume of 5,000 cubic yards or more three times during the most recent 365-day period. These requirements include submittal of a dust control plan and maintaining dust control records.

3.2.2 Impacts and Mitigation Measures

The following analysis considers the air quality impacts that would occur from the proposed project and alternatives. For purposes of this EIR, the evaluation of significance is determined by comparing impacts from the project and alternatives to the CEQA baseline.

3.2.2.1 Significance Criteria

The following thresholds were used in this EIR to determine the significance of Project air quality impacts for CEQA purposes. These criteria are identified in the *Antelope Valley AQMD CEQA and Federal Conformity Guidelines* (AVAQMD 2008).

3.2.2.1.1 Construction Impacts

Project construction would produce significant air quality impacts under the following circumstances:

AQ-1: The project results in construction-related emissions that exceed any of the AVAQMD annual and daily thresholds of significance in Table 3.2-3:

Table 3.2-3. AVAQMD Significance Emission Thresholds for Criteria Pollutants (Construction or Operational Emissions)

Criteria Pollutant	*Annual Threshold (tons)*	*Daily Threshold (pounds)*
Carbon Monoxide (CO)	100	548
Oxides of Nitrogen (NO_x)	25	137
Volatile Organic Compounds (VOC)	25	137
Oxides of Sulfur (SO_x)	25	137
Particulate Matter (PM_{10})	15	82

3.2.2.1.2 Operational Impacts

Project operations would produce significant air quality impacts under the following circumstances:

AQ-2: Project operational emissions exceed any of the AVAQMD annual and daily thresholds of significance in Table 3.2-3:

3.2.2.1.3 Construction or Operational Impacts

Project construction or operations would produce significant air quality impacts under the following circumstances:

AQ-3: Project emissions create an objectionable odor pursuant to AVAQMD Rule 402 at the nearest sensitive receptor;

AQ-4: Project emissions expose the public to significant levels of TACs. The determination of significance is based on the following:

- Maximum Incremental Cancer Risk greater or equal to 10 in 1 million (10 × 10-6);
- Non-cancer (chronic or acute) Hazard Index greater or equal to 1.0 (project increment); and
- Cancer burden greater than 0.5;

AQ-5: The proposed project would conflict with or obstruct implementation of applicable AVAQMD air quality attainment plans and SIP; or

AQ-6: There is currently little guidance and no local, regional, state, or federal regulation that establishes a threshold to determine the significance of how proposed GHG emissions impact climate change.

- Therefore, the proposed project utilizes the following as its threshold of significance:
- The proposed project would result in a significant impact if CO_2e emissions exceed baseline emissions.
- In absence of further guidance, this threshold is the most conservative, as any increase over the baseline would be designated as significant.

3.2.2.2 Methodology

Air pollutant emissions from the proposed construction and operations were calculated using the most current emission factors and methods, then compared to the thresholds identified in Section 3.2.2.1 to determine their significance. For impacts that exceed a significance criterion, mitigation measures were applied to project activities to determine their ability to reduce impacts to insignificance.

3.2.2.2.1 Construction Emissions

Project construction activities would require the use of off-road construction equipment and on-road trucks. These emission sources would primarily use diesel fuel, resulting in combustive emissions in the form of VOC, CO, NO_x, SO_x, and PM. In addition, equipment and vehicles traveling over unpaved surfaces and performing activities such as grading or earthmoving would generate fugitive dust emissions in the form of PM.

Equipment usage and scheduling data were used to calculate emissions for proposed construction activities. Appendix A-1 includes data and assumptions used to estimate emissions for proposed construction activities.

To estimate peak daily construction emissions for comparison to the AVAQMD significance thresholds, daily emissions for each construction activity were calculated for the duration of their proposed calendar schedule. Peak daily emissions were then determined by identifying the maximum daily emissions that would occur from overlapping construction activities during the entire construction calendar schedule. The analysis also compared peak annual construction emissions to the AVAQMD annual emission thresholds as a conservative approach to determine the significance of project construction emissions.

3.2.2.2.2 Operational Emissions

Project operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The emissions associated with the project operational activities are minimal. Therefore, it is not necessary to perform a quantification of project operational emissions.

Proposed Environmental Controls

EPA Tier 3 construction equipment would be used for construction activities. Due to this high level of emission control, few feasible mitigation measures are available to further reduce proposed emissions and air quality impacts.

Summaries of the emission control measures that the analysis considered as part of the unmitigated scenario for the project include the following.

- **Construction Equipment** – Construction contractors would use ultra low sulfur diesel fuel and construction equipment that meets EPA Tier 3 non-road standards. Since construction equipment that meets EPA Tier 3 non-road standards is the newest available and the most fuel efficient. Their use would minimize GHG emissions compared to earlier equipment.

Greenhouse Gases

The air quality analysis includes an estimate of GHG emissions produced from proposed construction activities. Sources considered in the construction analysis include those identified in this subsection for criteria pollutant impacts.

Fuel, power, and emission factors needed for the analysis were obtained from the (1) *California Climate Action Registry - General Reporting Protocol* (CCAR 2007), (2) CARB OFFROAD2007 Emissions Model, and (3) the CARB EMFAC2007 mobile source emissions models. Appendix A-1 includes data and assumptions used to estimate GHG emissions for proposed construction activities.

3.2.2.3 Proposed Project Impacts and Mitigation Measures

3.2.2.3.1 Construction Impacts

Impact AQ-1: Proposed project construction would not produce emissions that exceed AVAQMD annual and daily emission significance thresholds.

Table 3.2-4 presents an estimate of the unmitigated daily air emissions that would occur during the proposed project construction. Table 3.5-5 also presents an estimate of the unmitigated annual air emissions that would occur during the proposed project construction. To determine the significance of the proposed project emissions based on Significance Criterion AQ-1, the analysis included a review of the proposed construction

schedule to determine a peak daily and a peak annual period of activity and resulting emissions for comparison to the AVAQMD daily and annual emission thresholds.

Table 3.2-4. Peak Daily Construction Emissions for the Proposed Project

Stage of Construction	*Maximum Daily Emissions (Pounds)*					
	VOC	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Site Preparation	2.14	8.99	28.90	0.05	1.54	1.54
Basin/Pipeline Construction and Plumbing	7.07	39.27	95.46	0.14	6.39	6.39
Plumbing of Facility and Park Construction	3.50	16.73	43.35	0.06	2.93	2.93
Park Construction and Revegetation	3.77	20.45	49.54	0.07	2.95	2.95
Peak Construction Stage Daily Emissions	**7.07**	**39.27**	**95.46**	**0.14**	**6.39**	**6.39**
PM - Fugitive Dust [(1)]	- - -	- - -	- - -	- - -	52.25	13.32
Commuter Vehicles [(2)]	0.50	11.56	1.30	0.01	0.14	0.14
Peak Daily Emissions	**7.57**	**50.83**	**96.76**	**0.15**	**58.78**	**19.85**
AVAQMD Daily Significance Thresholds	**137**	**548**	**137**	**137**	**82**	**- - -**
Exceed Significance Thresholds?	***N***	***N***	***N***	***N***	***N***	***N***

Notes:

1. PM fugitive dust emissions are based on a peak daily disturbance of 10% of the largest acreage - 38-acre community park construction stage.
2. Commuter vehicle emissions based on 80 commuter vehicles and 23.4 miles of round-trip length (11.7 miles of single-trip length) to the project site - (average trip length obtained from South Coast Air Quality Management District (SCAQMD) CEQA Handbook, Table A9-5-D).

Table 3.2-5. Peak Annual Construction Emissions for the Proposed Project

Stage of Construction	*Maximum Annual Emissions (Pounds)*					
	VOC	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Site Preparation	27.79	123.33	382.65	0.60	19.97	19.97
Basin/Pipeline Construction	202.89	1,012.67	2,817.79	4.29	166.42	166.42
Plumbing of Facility	33.75	123.13	376.85	0.48	26.86	26.86
Park Construction	42.17	174.35	533.31	0.77	32.98	32.98
Revegetation	3.61	20.82	46.19	0.07	2.69	2.69
PM - Fugitive Dust [(1)]	- - -	- - -	- - -	- - -	13,585.00	1,385.67
Commuter Vehicles [(2)]	129.57	3,005.20	338.27	3.76	36.59	36.59
Peak Annual Emissions	**439.78**	**4,459.49**	**4,495.07**	**9.96**	**13,870.52**	**1,671.19**
Peak Annual Emissions (tons/yr)	**0.22**	**2.23**	**2.25**	**0.005**	**6.94**	**0.84**
AVAQMD Annual Significance Thresholds (tons/yr)	**25**	**100**	**25**	**25**	**15**	**- - -**
Exceed Significance Thresholds?	N	N	N	N	N	N

Notes:

1. PM fugitive dust emissions are based on a peak daily disturbance of 10% of the largest acreage - 38-acre community park construction stage for 60 days.
2. Commuter vehicle emissions based on 80 commuter vehicles and 23.4 miles of round-trip length (11.7 miles of single-trip length) to the project site - (average trip length obtained from SCAQMD CEQA Handbook, Table A9-5-D).

The calculation of unmitigated fugitive dust emissions from project earth-moving activities assumes a 75 percent reduction from uncontrolled levels to simulate rigorous watering of the site and use of other measures to ensure project compliance with AVAQMD Rule 403. The analysis assumes the use of construction equipment that complies with EPA non-road Tier 3 standards. As shown in Table 3.2-4, the peak daily emissions would occur from the overlapping basin/pipeline construction and plumbing facility construction stage.

As shown in Table 3.2-4, during a peak day of activity, the unmitigated proposed project construction emissions would be below the AVAQMD daily significance thresholds. The construction activities are scheduled to commence in early 2010 and would last for approximately one year. As shown in Table 3.2-5, the unmitigated proposed project peak annual construction emissions would be below the AVAQMD annual

significance thresholds. Therefore, the unmitigated proposed project construction emissions would not produce any significant air quality impacts.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

3.2.2.3.2 Operational Impacts

Impact AQ-2: The proposed project would not result in operational emissions that exceed AVAQMD annual and daily emission significance thresholds.

The proposed project operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. Such activities occur for limited times on an occasional basis. Therefore, the emissions associated with the project operational activities are minimal.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

3.2.2.3.3 Construction and Operational Impacts

Impact AQ-3: The proposed project would not create objectionable odors to sensitive receptors during construction.

The proposed project construction activities would generate air pollutants from the combustion of diesel fuels. Some individuals may sense that odors from diesel combustion emissions are objectionable, although quantifying the odorous impacts of these emissions to the public is difficult. The proposed project is adjacent to residences which are considered sensitive receptors. The mobile and intermittent nature of most project construction emission sources would help to adequately disperse combustive emissions from proposed construction activities. Therefore, proposed construction would result in less than objectionable odors to sensitive receptors.

The proposed project operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The emissions associated with the project operational activities are minimal. Therefore, proposed operational activities would not create objectionable odors.

Project construction and operations would involve less than significant odor impacts.

Mitigation Measures

Since impacts would be less than significant, no mitigation is required. However, if there are odor complaints related to project construction, the City should ensure that the complaints are investigated in case they are attributable to project activities.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-4: The proposed project would not expose receptors to significant levels of TACs.

The proposed project fossil-fueled construction equipment would emit TACs that are known to adversely affect public health. The proposed project construction would occur as a short-term and intermittent activity and as a result, it would produce minimal ambient concentrations of TACs. Therefore, the proposed project construction would not expose receptors to significant levels of TACs.

The proposed project operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The emissions associated with the project operational activities are minimal. Therefore, the proposed project operational activities would not expose receptors to significant levels of TACs.

Construction and operation of the proposed project would produce less than significant impacts to public health. Therefore, an HRA was not performed.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-5: The proposed project would not conflict with or obstruct implementation of the applicable AVAQMD air quality attainment plans and SIP.

The AVAQMD Ozone Attainment Plan, Implementation Schedule for Measures to Reduce PM and SIP proposes emission reduction measures that are designed to bring the MDAB into attainment of the national and state ambient air quality standards. The attainment strategies in the SIP include mobile source control measures and clean fuel programs that are enforced at the federal and state level on engine manufacturers and petroleum refiners and retailers. As a result, project activities would comply with these measures. The AVAQMD also adopts the control measures from the district air quality plans into the AVAQMD rules and regulations, which are then used to regulate sources of air pollution in the MDAB. The proposed project would comply with these regulatory requirements that are designed to implement the district air quality plans, such as the AVAQMD Rule 403 - Fugitive Dust. Thus, the proposed project would comply with the AVAQMD emission reduction measures that are designed to bring the MDAB into attainment of the national and state ambient air quality standards.

The proposed project would not conflict with or obstruct implementation of the AVAQMD air quality attainment plans and SIP. Therefore, in regard to criterion AQ-5, impacts would be less than significant.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-6: The proposed project would produce GHG emissions that would exceed the CEQA thresholds.

Climate change, as it relates to man-made GHG emissions, is by nature a global impact. An individual project does not generate by itself enough GHG emissions to significantly influence global climate change (AEP 2007). Thus, the issue of global climate change is a cumulative impact, such that an appreciable impact on global climate change would only occur when GHG emissions from a project combine with GHG emissions from other man-made activities on a global scale. Nevertheless, for the purposes of this EIR, the GHG emissions are assessed as a project-level impact.

3.2.2.3.4 GHG Emissions from Project Construction

Table 3.2-6 summarizes the GHG emissions generated from the construction of the proposed project. Sources considered in these emission calculations are the same as those analyzed for criteria pollutants.

Table 3.2-6 shows that the annual CO_2e emissions from the proposed project construction would increase relative to the CEQA Baseline levels. These increases in GHG emissions are considered to be a significant impact.

Table 3.2-6. Annual GHG Emissions from the Construction of the Proposed Project

Stage of Construction	*GHG Emissions (Pounds)*			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Site Preparation	74,611.44	10.28	0.92	75,112.94
Basin/Pipeline Construction	542,043.14	81.51	6.46	545,756.84
Plumbing of Facility	61,979.15	10.62	0.77	62,441.47
Park Construction	98,943.30	14.83	1.07	99,585.75
Revegetation	8,753.09	1.31	0.10	8,810.83
PM – Fugitive Dust	- - -	- - -	- - -	- - -
Commuter Vehicles	546,875.77	59.02	64.38	568,073.20
Total Annual GHG Emissions	**1,333,206**	**178**	**74**	**1,359,781**
Total Annual GHG Emissions (metric tons/yr)	**605**	**0.08**	**0.03**	**617**
CEQA Baseline Emissions	0	0	0	0
Net Change Versus CEQA Baseline	**605**	**0.08**	**0.03**	**617**

Notes:
1. One metric ton equals 1000 kilograms, 2205 lbs, or 1.1 U.S. (short) tons.
2. CO2e = the carbon dioxide equivalent emissions of all GHG combined. The carbon dioxide equivalent emission rate for each GHG represents the emission rate multiplied by its GWP. The GWPs are 1 for CO2; 21 for CH4; and 310 for N2O.

Source: U.S. Environmental Protection Agency, U.S. Greenhouse Gas Emissions and Sinks: 1990-2000 (April 2002).

Mitigation Measures

Since the analysis assumes the use of construction equipment that complies with EPA non-road Tier 3 standards, no other feasible mitigation measures are available to reduce GHG construction emissions for the proposed project.

Significance of Impacts After Mitigation

The construction GHG impacts from the proposed project would be significant.

3.2.2.3.5 GHG Emissions from Project Operations

Project operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The GHG emissions associated with the project operational

activities are minimal. Therefore, it is not necessary to perform a quantification of project operational GHG emissions. However, the annual CO_2e emissions from the proposed project operational activities would still increase relative to the CEQA Baseline levels. These increases in GHG emissions are considered to be a significant impact.

Mitigation Measures

There are no feasible mitigation measures available to reduce GHG operational emissions for the proposed project.

Significance of Impacts After Mitigation

The operational GHG impacts from the proposed project would be significant.

3.2.2.4 Alternative 1 – No In-Stream Recharge Basins

3.2.2.4.1 Construction Impacts

Impact AQ-1: The No In-Stream Recharge Basin Alternative construction would produce emissions that exceed AVAQMD annual and daily emission significance thresholds.

Alternative 1 would alter the number of Recharge Basins. Under this alternative, construction of the in-stream recharge basins would not occur. Emissions from construction of Alternative 1 would be less than those estimated for the proposed project. Since the unmitigated proposed project construction emissions would not produce any significant air quality impacts, it is not necessary to perform a quantification of construction emissions associated with Alternative 1. The impacts of Alternative 1 would be less than significant.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

3.2.2.4.2 Operational Impacts

Impact AQ-2: The No In-Stream Recharge Basin Alternative would not result in operational emissions that exceed AVAQMD annual and daily emission significance thresholds.

The No In-Stream Recharge Basin Alternative operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The emissions associated with the No In-Stream Recharge Basin Alternative operational activities are minimal. Therefore, it is not necessary to perform a quantification of the No In-Stream Recharge Basin Alternative operational emissions. The impacts of Alternative 1 would be less than significant.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

3.2.2.4.3 Construction and Operational Impacts

Impact AQ-3: The No In-Stream Recharge Basin Alternative would not create objectionable odors to sensitive receptors.

The No In-Stream Recharge Basin Alternative construction activities would generate air pollutants from the combustion of diesel fuels. Some individuals may sense that diesel combustion emissions are objectionable in nature, although quantifying the odorous impacts of these emissions to the public is difficult. The project site is adjacent to residences which are considered sensitive receptors. The mobile and intermittent nature of most project construction emission sources would help to adequately disperse combustive emissions from proposed construction activities. Therefore, proposed construction would result in less than objectionable odors to sensitive receptors.

The No In-Stream Recharge Basin Alternative operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The emissions associated with the No In-Stream Recharge Basin Alternative operational activities are minimal. Therefore, the No In-Stream Recharge Basin Alternative operational activities would not create objectionable odors to sensitive receptors.

The construction activities associated with the No In-Stream Recharge Basin Alternative construction and operations would involve less than significant odor impacts.

Mitigation Measures

Since impacts would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-4: The No In-Stream Recharge Basin Alternative would not expose receptors to significant levels of TACs.

The No In-Stream Recharge Basin Alternative construction equipment would emit TACs that are known to adversely affect public health. The No In-Stream Recharge Basin Alternative construction would occur as a short-term and intermittent activity and as a result, it would produce minimal ambient concentrations of TACs. As a result, the No In-Stream Recharge Basin Alternative construction would not expose receptors to significant levels of TACs.

The No In-Stream Recharge Basin Alternative operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The emissions associated with the No In-Stream Recharge Basin Alternative operational activities are minimal. Therefore, the No In-Stream Recharge Basin Alternative operational activities would not expose receptors to significant levels of TACs.

Construction and operation of the No In-Stream Recharge Basin Alternative would produce less than significant impacts to public health. Therefore, an HRA was not performed.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-5: The No In-Stream Recharge Basin Alternative would not conflict with or obstruct implementation of the applicable AVAQMD air quality attainment plans and SIP.

Project activities would comply with the AVAQMD Ozone Attainment Plan, Implementation Schedule for Measures to Reduce PM and the SIP. The AVAQMD also adopts the control measures from the district air quality plans into the AVAQMD rules and regulations, which are then used to regulate sources of air pollution in the MDAB. The No In-Stream Recharge Basin Alternative would comply with the AVAQMD rules and regulations, such as the AVAQMD Rule 403 - Fugitive Dust. Thus, the No In-Stream Recharge Basin Alternative would comply with the AVAQMD emission reduction measures. Therefore, in regard to criterion AQ-5, impacts would be less than significant.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-6: The No In-Stream Recharge Basin Alternative would produce GHG emissions that would exceed the CEQA thresholds.

3.2.2.4.4 GHG Emissions from the No In-Stream Recharge Basin Alternative Construction

Emissions from construction of the No In-Stream Recharge Basin Alternative would be less than those estimated for the proposed project. However, the annual CO_2e emissions from the No In-Stream Recharge Basin Alternative construction would still increase relative to the CEQA Baseline levels. These increases in GHG emissions are considered to be a significant impact.

Mitigation Measures

Since the analysis assumes the use of construction equipment that complies with EPA non-road Tier 3 standards, no other feasible mitigation measures are available to reduce GHG construction emissions for the No In-Stream Recharge Basin Alternative.

Significance of Impacts After Mitigation

The construction GHG impacts from the No In-Stream Recharge Basin Alternative would be significant.

3.2.2.4.5 GHG Emissions from the No In-Stream Recharge Basin Alternative Operations

The No In-Stream Recharge Basin Alternative operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The GHG emissions associated with the No In-Stream Recharge Basin Alternative operational activities are minimal. However, the

annual CO_2e emissions from the No In-Stream Recharge Basin Alternative operational activities would still increase relative to the CEQA Baseline levels. These increases in GHG emissions are considered to be a significant impact.

Mitigation Measures

There are no feasible mitigation measures available to reduce GHG operational emissions.

Significance of Impacts After Mitigation

The operational GHG impacts from the No In-Stream Recharge Basin Alternative would be significant.

3.2.2.5 Alternative 2 – Reduced Area of Off-Channel Recharge Basins

3.2.2.5.1 Construction Impacts

Impact AQ-1: The Reduced Area of Off-Channel Recharge Basins Alternative construction would not produce emissions that exceed AVAQMD annual and daily emission significance thresholds.

Alternative 2 would reduce the number of proposed off-channel recharge basins from six to three and restore the unused areas as native habitat. Emissions from construction of Alternative 2 would be less than those estimated for the proposed project.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

3.2.2.5.2 Operational Impacts

Impact AQ-2: The Reduced Area of Off-Channel Recharge Basins Alternative would not result in operational emissions that exceed AVAQMD annual and daily emission significance thresholds.

The Reduced Area of Off-Channel Recharge Basins Alternative operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The emissions associated with the Reduced Area of Off-Channel Recharge Basins Alternative operational activities are minimal.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

3.2.2.5.3 Construction and Operational Impacts

Impact AQ-3: The Reduced Area of Off-Channel Recharge Basins Alternative would not create objectionable odors to sensitive receptors.

The Reduced Area of Off-Channel Recharge Basins Alternative construction activities would generate air pollutants from the combustion of diesel fuels. The project site is adjacent to residences which are considered sensitive receptors. The mobile and intermittent nature of most project construction emission sources would help to adequately disperse combustive emissions from proposed construction activities. Therefore, proposed construction would result in less than objectionable odors to sensitive receptors. The emissions associated with the Reduced Area of Off-Channel Recharge Basins Alternative operational activities are minimal. Therefore, the Reduced Area of Off-Channel Recharge Basins Alternative operational activities would not create objectionable odors to sensitive receptors.

The activities associated with the Reduced Area of Off-Channel Recharge Basins Alternative construction and operations would involve less than significant odor impacts.

Mitigation Measures

Since impacts would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-4: The Reduced Area of Off-Channel Recharge Basins Alternative would not expose receptors to significant levels of TACs.

The Reduced Area of Off-Channel Recharge Basins Alternative fossil-fueled construction equipment would emit TACs that are known to adversely affect public health. However, construction would occur as a short-term and intermittent activity and would produce minimal ambient concentrations of TACs.

Similarly, the emissions associated with the Reduced Area of Off-Channel Recharge Basins Alternative operational activities are minimal. Therefore, the Reduced Area of Off-Channel Recharge Basins Alternative operational activities would not expose receptors to significant levels of TACs.

Construction and operation of the Reduced Area of Off-Channel Recharge Basins Alternative would produce less than significant impacts to public health. Therefore, an HRA was not performed.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-5: The Reduced Area of Off-Channel Recharge Basins Alternative would not conflict with or obstruct implementation of the applicable AVAQMD air quality attainment plans and SIP.

Project activities would comply with the AVAQMD Ozone Attainment Plan, Implementation Schedule for Measures to Reduce PM and the SIP. The AVAQMD also adopts the control measures from the district air

quality plans into the AVAQMD rules and regulations, which are then used to regulate sources of air pollution in the MDAB. This alternative would comply with the AVAQMD rules and regulations, such as the AVAQMD Rule 403 - Fugitive Dust. Thus, the Reduced Area Off-Channel Recharge Basin Alternative would comply with the AVAQMD emission reduction measures. Therefore, in regard to criterion AQ-5, impacts would be less than significant.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-6: The Reduced Area of Off-Channel Recharge Basins Alternative would produce GHG emissions that would exceed the CEQA thresholds.

3.2.2.5.4 GHG Emissions from the Reduced Area of Off-Channel Recharge Basins Alternative Construction

Emissions from construction of the Reduced Area of Off-Channel Recharge Basins Alternative would be less than those estimated for the proposed project. However, the annual CO_2e emissions from the Reduced Area of Off-Channel Recharge Basins Alternative construction would still increase relative to the CEQA Baseline levels. These increases in GHG emissions are considered to be a significant impact.

Mitigation Measures

Since the analysis assumes the use of construction equipment that complies with EPA non-road Tier 3 standards, no other feasible mitigation measures are available to reduce GHG construction emissions for the Reduced Area of Off-Channel Recharge Basins Alternative.

Significance of Impacts After Mitigation

The construction GHG impacts from the Reduced Area of Off-Channel Recharge Basins Alternative would be significant.

3.2.2.5.5 GHG Emissions from the Reduced Area of Off-Channel Recharge Basins Alternative Operations

The Reduced Area of Off-Channel Recharge Basins Alternative operational activities include operation and occasional maintenance of the groundwater recharge facilities, nature park and conservation area. The GHG emissions associated with the Reduced Area of Off-Channel Recharge Basins Alternative operational activities are minimal. Therefore, it is not necessary to perform a quantification of project operational GHG emissions. However, the annual CO_2e emissions from the Reduced Area of Off-Channel Recharge Basins Alternative operational activities would still increase relative to the CEQA Baseline levels. These increases in GHG emissions are considered to be a significant impact.

Mitigation Measures

There are no feasible mitigation measures available to reduce GHG operational emissions for the Reduced Area of Off-Channel Recharge Basins Alternative.

Significance of Impacts After Mitigation

The operational GHG impacts from the Reduced Area of Off-Channel Recharge Basins Alternative would be significant.

3.2.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

3.2.2.6.1 Construction Impacts

Impact AQ-1: The Alternative Aqueduct Diversion Pipeline Alignments construction would produce emissions that exceed AVAQMD annual and daily emission significance thresholds.

Alternative 3 would include alternative locations for the Aqueduct Diversion Pipeline. This alternative differs from the original project in that it changes the alignment of the Aqueduct Diversion Pipeline. This alternative considers two different pipeline alignments; Alignment "A" located on the north side of Amargosa Creek; and Alignment "B" buried in the Amargosa Creek stream channel. The pipeline for Alignment "A" would be 675 feet shorter than the route for the proposed project and the pipeline for Alignment "B" would be 775 feet shorter than the route for the proposed project. Emissions from construction of Alternative 3 would be less than those estimated for the proposed project.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

3.2.2.6.2 Operational Impacts

Impact AQ-2: The Alternative Aqueduct Diversion Pipeline Alignments would not result in operational emissions that exceed AVAQMD annual and daily emission significance thresholds.

The emissions associated with the Alternative Aqueduct Diversion Pipeline Alignments operational activities are minimal.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

3.2.2.6.3 Construction and Operational Impacts

Impact AQ-3: The Alternative Aqueduct Diversion Pipeline Alignments would not create objectionable odors to sensitive receptors.

As for the proposed project, the Alternative Aqueduct Diversion Pipeline Alignments construction activities would result in objectionable odors to sensitive receptors. However, emissions associated with the Alternative

Aqueduct Diversion Pipeline Alignments operational activities are minimal and would not create objectionable odors to sensitive receptors.

The activities associated with the Alternative Aqueduct Diversion Pipeline Alignments construction and operations would involve less than significant odor impacts.

Mitigation Measures

Since impacts would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-4: The Alternative Aqueduct Diversion Pipeline Alignments would not expose receptors to significant levels of TACs.

The Alternative Aqueduct Diversion Pipeline Alignments construction would produce minimal ambient concentrations of TACs. As a result, the Alternative Aqueduct Diversion Pipeline Alignments construction would not expose receptors to significant levels of TACs.

The Alternative Aqueduct Diversion Pipeline Alignments operational activities would be minimal. Therefore, the Alternative Aqueduct Diversion Pipeline Alignments operational activities would not expose receptors to significant levels of TACs.

Construction and operation of the Alternative Aqueduct Diversion Pipeline Alignments would produce less than significant impacts to public health. Therefore, an HRA was not performed.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-5: The Alternative Aqueduct Diversion Pipeline Alignments would not conflict with or obstruct implementation of the applicable AVAQMD air quality attainment plans and SIP.

The project activities would comply with the AVAQMD Ozone Attainment Plan, Implementation Schedule for Measures to Reduce PM and the SIP. The AVAQMD also adopts the control measures from the district air quality plans into the AVAQMD rules and regulations, which are then used to regulate sources of air pollution in the MDAB. This alternative would comply with the AVAQMD rules and regulations, such as the AVAQMD Rule 403 - Fugitive Dust. Thus, the Alternative Diversion Pipeline Alignments would comply with the AVAQMD emission reduction measures. Therefore, in regard to criterion AQ-5, impacts would be less than significant.

Mitigation Measures

As impacts on air quality would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on air quality would be less than significant.

Impact AQ-6: The Alternative Aqueduct Diversion Pipeline Alignments would produce GHG emissions that would exceed the CEQA thresholds.

3.2.2.6.4 GHG Emissions from the Alternative Aqueduct Diversion Pipeline Alignments Construction

Emissions from construction of the Alternative Aqueduct Diversion Pipeline Alignments would be less than those estimated for the proposed project. However, the annual CO_2e emissions from the Alternative Aqueduct Diversion Pipeline Alignments construction would still increase relative to the CEQA Baseline levels and are considered a significant impact.

Mitigation Measures

Since the analysis assumes the use of construction equipment that complies with EPA non-road Tier 3 standards, no other feasible mitigation measures are available to reduce GHG construction emissions for the Alternative Aqueduct Diversion Pipeline Alignments.

Significance of Impacts After Mitigation

The construction GHG impacts from the Alternative Aqueduct Diversion Pipeline Alignments would be significant.

3.2.2.6.5 GHG Emissions from the Alternative Aqueduct Diversion Pipeline Alignments Operations

The GHG emissions associated with the Alternative Aqueduct Diversion Pipeline Alignments operational activities are minimal. Therefore, it is not necessary to perform a quantification of project operational GHG emissions. However, the annual CO_2e emissions from the Alternative Aqueduct Diversion Pipeline Alignments operational activities would still increase relative to the CEQA Baseline levels. These increases in GHG emissions are considered to be a significant impact.

Mitigation Measures

There are no feasible mitigation measures available to reduce GHG operational emissions for the Alternative Aqueduct Diversion Pipeline Alignments.

Significance of Impacts After Mitigation

The operational GHG impacts from the Alternative Aqueduct Diversion Pipeline Alignments would be significant.

3.2.2.7 Alternative 4 – No Project Alternative

The No Project Alternative would result in the construction of approximately 280 residential units on lots of 7,000 square feet or greater. Construction of the housing development would involve somewhat greater construction impacts that the proposed project by virtue of the larger physical areas involved and the numerous structures that would be built. The proposed project involves construction of two pipelines and six

off-channel recharge basins as well as some grading involved in preparation of revegetation of areas from which non-native vegetation is removed.

Unlike the proposed project, the No Project Alternative would involve continued emissions related to gas-fired heaters and stoves; motor vehicles; and fossil fueled engines for lawn mowers, other garden equipment, pressure washers, generators, air compressors, and other common household devices. Compared to the minimal emissions associated with the operation and maintenance of the UAP, a housing development would result in considerably greater total emissions of all air pollutants, including greenhouse gases.

3.2.3 Mitigation Monitoring Program

While significant GHG emission would be associated with the proposed project and its alternatives by virtue of a zero threshold for GHG emissions, there are no feasible mitigation measures to reduce GHG emissions sufficiently that the project would not result in some increase in GHGs. There being no measures to monitor, no mitigation monitoring program for Air Quality related impacts is proposed.

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3.3 Biological Resources

3.3.1 Environmental Setting

3.3.1.1 Area of Influence

The area of influence for biological resources includes the project property and extends downstream to encompass native biological resources that could be affected by the project.

3.3.1.2 Setting

The proposed project site is located in the southern region of the Antelope Valley within the City of Palmdale in Los Angeles County, California. The project area is within the Mojave Desert region of the Desert Province. The terrain generally consists of the Amargosa Creek channel, open areas, engineered slopes, and disturbed areas that are moderately vegetated and provide habitat for a variety of wildlife species and vegetation, as described below. Predominant vegetation communities within the region include Mojave creosote bush scrub and saltbush scrub. The project site is located within the Antelope Valley Significant Ecological Area (SEA), which is classified as a land and water system that is "valuable as plant and/or animal communities, often integral to the preservation of threatened or endangered species and the conservation of biological diversity in the County" (Los Angeles County 2008).

Biological resources within the project area were assessed during biological surveys conducted by SAIC in March 2008 through June 2008 after initial reconnaissance in October 2007. Sources of information for this analysis include the West Mojave Habitat Conservation Plan (BLM 2005); a search of rare, threatened, endangered, and sensitive species (CDFG 2008); literature information for habitat preferences; expertise of preparers; and field surveys conducted by SAIC biologists in October 2007 and March 2008 through June 2008.

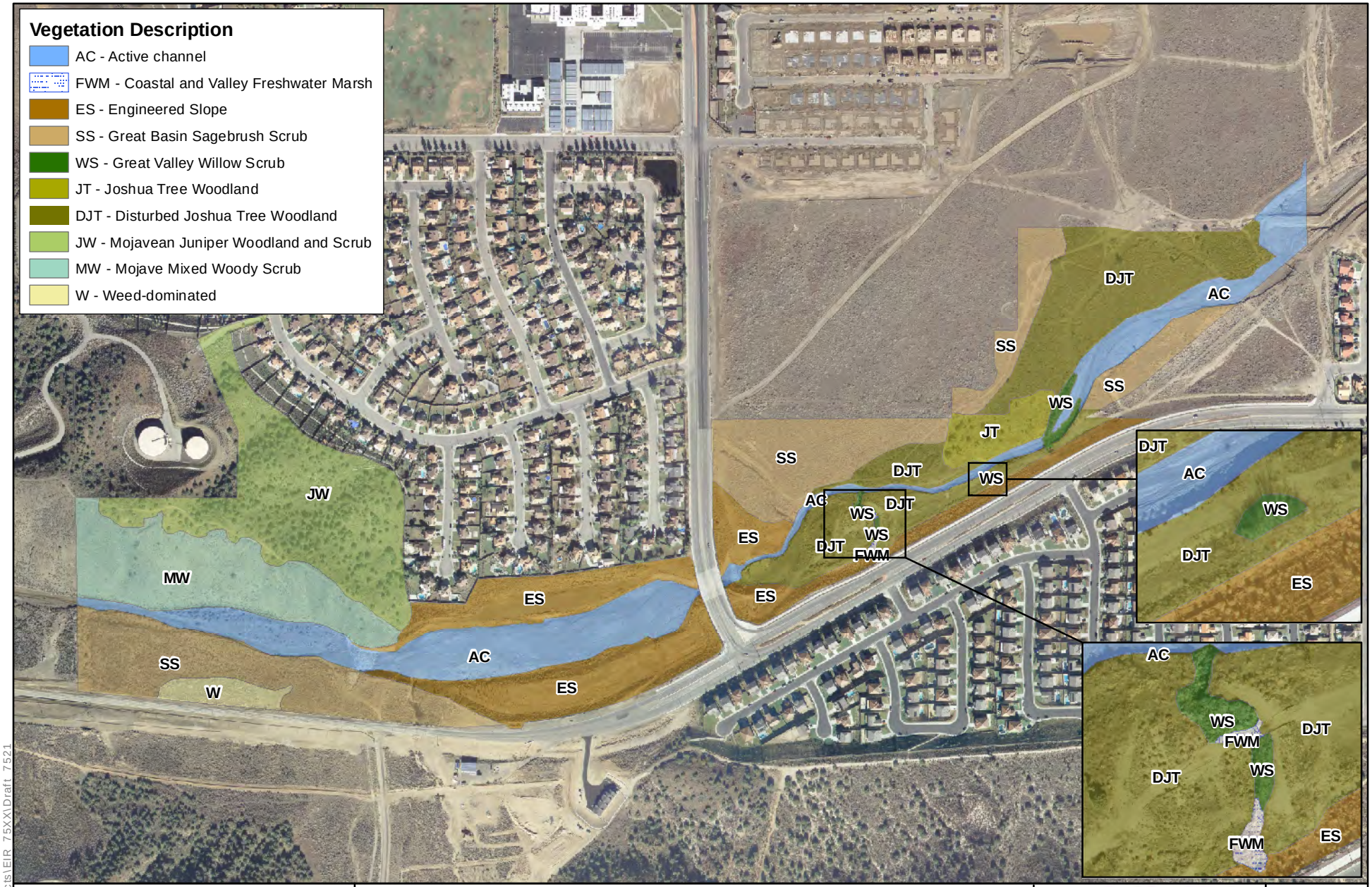
3.3.1.2.1 Vegetation Communities

Vegetation communities within the project site consists of various desert or semi-desert scrub communities and is dominated by Great Basin sagebrush scrub and disturbed Joshua tree woodlands. Other plant communities present in the project area include riparian/wetland, weed-dominated, and disturbed/developed, including the active channel of Amargosa Creek and engineered slopes.

The vegetation/land cover map is provided in Figure 3.3-1 and a map of disturbed areas in provided in Figure 3.3-2. Acreage for each mapped vegetation type is presented in Table 3.3-1 and each vegetation type is described in the following sections.

Big (Great Basin) Sagebrush Scrub

Big sagebrush scrub occurs in previously disturbed terraces adjacent to Amargosa Creek. Dominant shrub species include big sagebrush (*Artemisia tridentata* subsp. *tridentata*), also known as Great Basin sagebrush, Mojave rubber rabbitbrush (*Chrysothamnus nauseosus*), and four-wing salt bush (*Atriplex canescens*). Shrub vegetation is highly variable, ranging from very low density in the southwestern portion of the site to dense shrub cover in the northeastern portion of the project site. Dense shrub habitats are also co-dominated by Mormon tea (*Ephedra nevadensis*). Areas with higher shrub diversity also have a higher diversity of native wildflowers including lacy phacelia (*Phacelia tanacetifolia*), fiddleneck (*Amsinckia tessellata*), and silver puffs (*Uropappus lindleyi*). Disturbed areas, including trails, occur throughout the project site (Figure 3.3-2).



NOTES:
Base Map: LARIAC 4-in res airphoto, 2006
Coordinate System: CA State Plane Zone V (ft)
Horizontal Datum: NAD 83

UAP Vegetation Classification

0 250 500 1,000 1,500 2,000
Feet

SAIC From Science to Solutions

DATE: 12/30/08 BY: D Beckwith

FIGURE: 3.3-1

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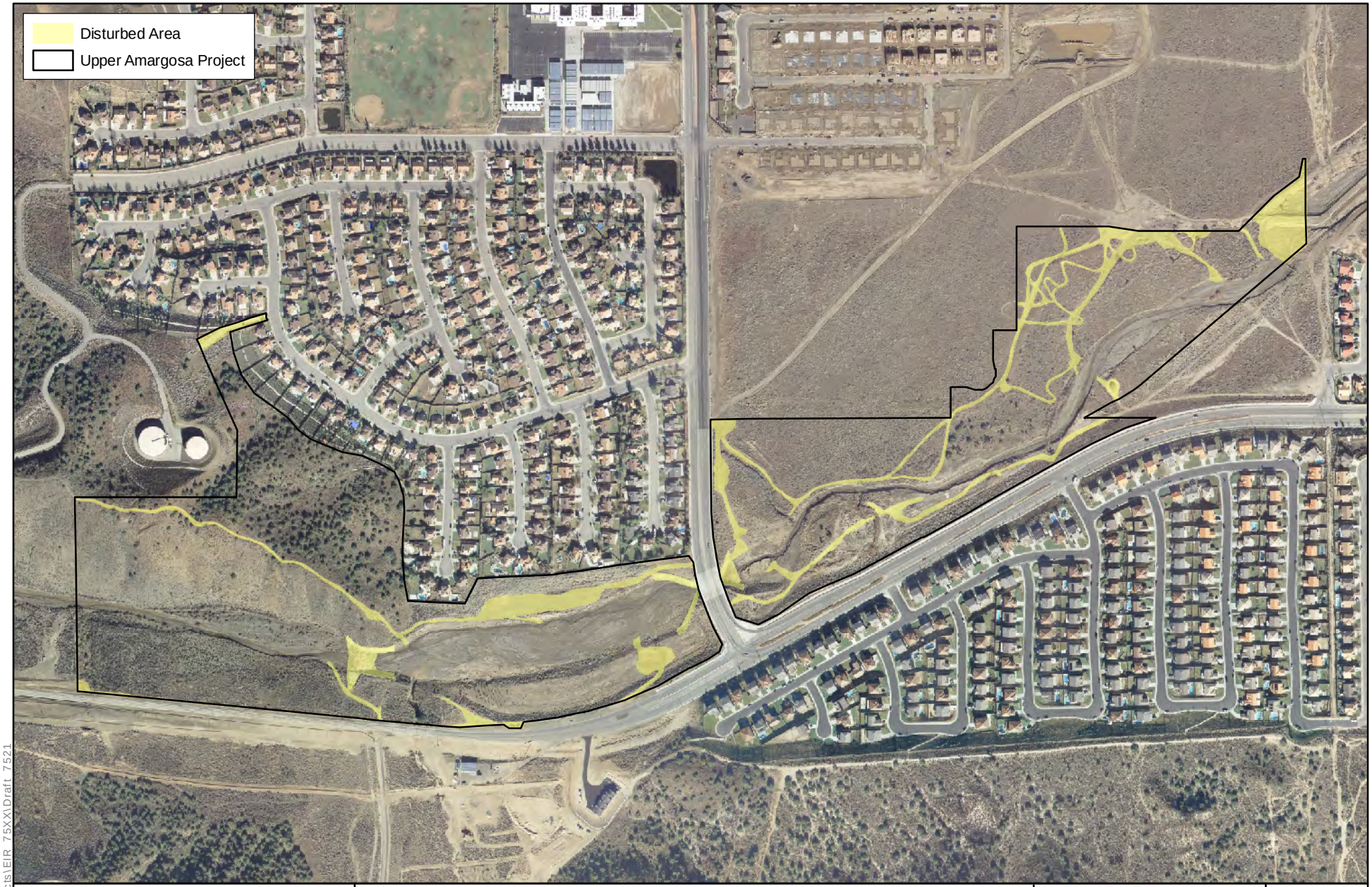

NOTES:
Base Map: LARIAC 4-in res airphoto, 2006
Coordinate System: CA State Plane Zone V (ft)
Horizontal Datum: NAD 83

UAP Disturbed Areas

0 250 500 1,000 1,500 2,000
Feet

SAIC From Science to Solutions

DATE: 12/22/08 | BY: D Beckwith

FIGURE: 3.3-2

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Table 3.3-1. Vegetation and Land Cover Types Within the Project Planning Area

Vegetation Description	*Map Key*	*Total Acres*
Great Basin Sagebrush Scrub	SS	17.0
Disturbed Joshua Tree Woodland	DJT	12.5
Mojavean Juniper Woodland and Scrub	JW	12.2
Active Channel	AC	12.1
Engineered Slope[1]	ES	12.0
Disturbed[2]		8.6
Mojave Mixed Woody Scrub	MW	8.5
Joshua Tree Woodland	JT	1.9
Weed-dominated	W	1.2
Great Valley Willow Scrub	WS	0.6
Coastal and Valley Freshwater Marsh	FWM	0.1
	Total Acres	**86.9**

Notes:

1. Undisturbed portion (acres) of engineered slope includes some areas where there has been some regrowth of vegetation but are still relatively barren and could also have been considered as disturbed.
2. Vegetation categories were adapted from Holland (1986). Several land cover types identified for this project site are not described in Holland. These include engineered slopes, active channel, weed-dominated, and disturbed. Recent disturbance (acres) includes features where the ground is barren or overgrown by invasive species (= weed dominated) because of recent disturbance (e.g., roads, trails, recently graded areas, and berms.).

Mojavean Juniper Woodland

Mojavean juniper woodland occurs in one location at the proposed project site: a northeast-facing slope in the western portion of the project site (Figure 3.3-1). This area is dominated by California juniper (*Juniperus californica*). Occasional Joshua trees (*Yucca brevifolia*) are present as well. This habitat is relatively open with smaller shrub species among the junipers. Other shrub species include buckwheat (*Eriogonum fasciculatum*), interior goldenbush (*Ericameria linearifolia*) , and Mormon tea. Wildflowers are common in this portion of the project site in the spring and include sapphire woolly star (*Eriastrum sapphirinum*), blue dicks (*Dichelostemma capitatum*), and Fremont's phacelia (*Phacelia fremontii*).

Active Channel

The active Amargosa Creek channel area is scoured by high flows during most years (Figure 3.3-1). This area is primarily open habitat with a rocky or sandy substrate. Vegetation is limited to a few small scattered pockets of shrubs such as mulefat (*Baccharis salicifolia*) and tarragon (*Artemisia dracunculus*). Individual tamarisks (also known as salt cedars) (*Tamarix sp.*), a non-native invasive species, are also present. Seedling Fremont cottonwood (*Populus fremontii*) are present adjacent to a low flow channel upstream from the 25th Street Bridge. Annual wildflowers may be common in sandy areas in the spring, after runoff has subsided.

Engineered Slopes

Engineered slopes are located along Elizabeth Lake Road, near the 25th Street Bridge, and south of existing residences on the west side of 25th Street. These areas consist of compacted soils. Most areas have received a revegetation treatment and native and non-native shrubs are present. Cover is highly variable, and some areas are fairly sparse. Dominant plant species include Mojave rubber rabbitbrush and Great Basin sagebrush. Approximately 1,000 feet west of the 25th Street Bridge, the site contains a small area of densely planted Joshua trees that have been salvaged from other sites as mitigation.

Disturbed Habitats

Habitats mapped as "disturbed" consist mainly of roads and trails that transverse on-site habitat areas (Figure 3.3-2). These areas have no vegetation and the soil surface is generally compacted.

Mojave Mixed Woody Scrub

Mojave mixed woody scrub occurs on a steep, south-facing slope north of the Amargosa Creek channel. This habitat includes s many of the species described for big sagebrush scrub, however, these species typically co-dominate. This dense habitat cover also includes widely scattered California juniper, and dense patches of bladder-sage (*Salazaria mexicana*), peach thorn (*Lycium cooperi*), Mormon tea, and desert tomato (*Lycium andersonii*). Other perennials in this area include silver cholla (*Opuntia echinocarpa*) and desert needlegrass (*Achnatherum speciosum*). Native annual species are abundant in the spring and cover the hilltop and hillside areas. Abundant annual species observed during SAIC surveys include California poppy (*Eschscholzia californica*), lacy phacelia, Bigelow's coreopsis (*Coreopsis bigelovii*), and club-fruited primrose (*Camissonia claviformis*).

Joshua Tree Woodland

Joshua Tree Woodland occurs as one remnant patch adjacent to the northern side of the Amargosa Creek channel, approximately 1,000 feet east of the 25th Street Bridge (Figure 3.3-1). Dominant plant species include California juniper and Joshua tree, with smaller shrub species including California buckwheat, Mormon tea, and peach thorn. This area has discarded building materials, other trash, and a variety of unusual mounds. Understory vegetation is relatively open and consists primarily of non-native grass species, including cheat grass (*Bromus tectorum*). Remnant individuals of long-lived shrubs characteristic of this community, including Joshua trees, California junipers, peach thorn, and Mormon tea, suggest that this community type was formerly more widespread on both sides of Amargosa Creek.

Weed-Dominated Habitats

Weed-dominated areas are concentrated in recently disturbed areas adjacent to Elizabeth Lake Road in the western portion of the project site and is dominated by hoary cress (*Cardaria sp.*), an invasive non-native species.

Great Valley Willow Scrub

Two localized areas of Great Valley willow scrub occur at outlets to concrete culverts conveying drainage from the neighborhood across Elizabeth Lake Road, approximately 750 feet and 1500 feet east of the 25th Street Bridge. Dominant species include red willow (*Salix laevigata*), sandbar willow (*Salix exigua*), mulefat (*Baccharis salicifolia*), and occasional Goodding's willow (*Salix gooddingii*). Vegetation is relatively dense and there is very little understory (see discussion under wetlands 3.3.1.2.6).

Coastal and Valley Freshwater Marsh

One very localized area of coastal and valley freshwater marsh occurson site at an outlet to a concrete culvert conveying drainage from residential areas across Elizabeth Lake Road, approximately 750 feet east of the 25th Street Bridge. Dominant vegetation consists of cattail (*Typha* sp.), bulrushes (*Scirpus* spp.), and mulefat (see discussion under wetlands 3.3.1.2.6).

3.3.1.2.2 Wildlife

The project site supports a diverse assemblage of wildlife species that use the varied habitats present. Wildlife species at the project site was surveyed during SAIC site visits site visits on March 12, April 16, April 17, and May 12, 2008. Wildlife observed within the project site included one amphibian species, four reptile species, 29 bird species, and three mammal species. A complete list of wildlife species observed during SAIC site surveys is included in Appendix B-1). Small mammal trapping surveys were also conducted on April 16 and April 17, 2008 to ascertain the general small mammal populations (refer to Appendix B-2 for additional details).

Common wildlife observed in the big sagebrush (great basin sagebrush) scrub, Mojave mixed woody scrub, and Joshua Tree woodland habitats include: Coast horned lizards, Western whiptail, Common side-blotched lizard, common raven, cliff swallow, Northern mockingbird, European starling, white-crowned sparrow, Anna's hummingbird, and Western scrub jay. In addition, tracks and scat of coyote, desert cotton tail, and black-tailed jackrabbit were abundant. Other common species expected to occur within these habitats include Merriam's chipmunk, kangaroo rats, wood rats, pocket mice, deer mice, grasshopper mice, California vole, Pacific-slope flycatcher, California thrasher, sparrow species, and hawk species. Numerous California ground squirrels were observed in burrows across the project site.

Mojavean juniper woodlands within the project site provides habitat for several avian species, including bushtit, Bewick's wren, Epidonoax flycatcher, and California towhee, and small mammals, including rodent species such as pinyon mouse, woodrats, and plain titmouse. In addition, numerous juniper trees supported active desert woodrat middens (nests).

Common wildlife species observed along the Amargosa Creek channel included Pacific treefrog, song sparrow, California quail, and Wilson's warbler. Three waterfowl species, mallard, common merganser, and double-crested cormorant, were also observed flying overhead toward the retention basins northwest of the project site.

3.3.1.2.3 Special Status Species

Plant and wildlife species that have special status may be protected under policies of federal, state, and/or local agencies. These include species listed or formally proposed for protection under the Federal or California Endangered Species acts (ESA and CESA, respectively). Additionally, species that are not protected by the ESA and/or CESA, but are recognized by various organizations including the California Native Plant Society (CNPS), the California Department of Fish and Game (CDFG), and other entities as rare, declining, or species of local concern are collectively termed "other sensitive species" in this document.

The CDFG's California Natural Diversity Data Base (CNDDB) (CDFG 2008) has records for several rare, threatened, endangered, and sensitive plant and animal species that occur within the following five USGS 7.5 minute quadrangles: Sleepy Valley, Lancaster West, Del Sur, Ritter Ridge, and Palmdale. The list of species from that search was reduced to those species that have the potential to occur in habitats found in the proposed project area. Other special status species with the potential to occur in the Project area were added as appropriate. The special status species that are addressed in this document are listed in Table 3.3-2 and include two plant, two reptiles, three bird, and two mammal species.

Table 3.3-2. Special Status Plant and Animal Species Potentially Occurring in the Project Vicinity

***Scientific Name/* Common Name**	***Regulatory Status Fed/State/ CNPS[2]***	***Habitat Description/Distribution in Project Area***	***Potential to Occur within Project Site***
Plants			
Opuntia basilaris var. brachyclada short-joint beavertail	--/--/1B	Found in sandy soil or coarse, granitic loam in chaparral, Joshua tree woodland, Mojavean Desert scrub, pinyon-juniper woodland, and riparian woodland. Found from 425-1800 meters. Not observed on-site during 2008 site surveys, though found by the SAIC biologists within ¼ mile of the site; potentially suitable habitat present.	Low
Yucca brevifolia Joshua Tree	--/--/--	Joshua tree is a visually dominant species over large areas of the Mojave desert from 2,000 to 6,000 feet in elevation usually in association with low desert shrubs and sometimes with California junipers. It is a characteristic species of undeveloped areas around Palmdale and is protected by local policy and ordinance (see section 3.3.1.3.3). Its distinctive silhouette is emblematic of the Mojave Desert.	Present
Reptiles			
Anniella pulchra pulchra silvery legless lizard	--/CSC/--	Inhabit sandy or loose loamy soils (preferably with high moisture content) under sparse vegetation. Suitable habitat exists within the project area; species likely to occur. Six recorded occurrences in 5-quad vicinity (nearest is approximately one mile west of Project site).	High
Phrynosoma coronatum (blainvillii and frontale population) coast (San Diego and California, respectively horned lizard	--/CSC/--	These nearly identical lizards are known from coastal sage scrub and chaparral habitats in arid and semi-arid climates. They prefer friable, rocky, or shallow sandy soils and prey mainly on ants. Suitable habitat present; One individual observed (subspecies unknown) during April 2008 SAIC site visit. Six recorded occurrences in 5-quad vicinity for *blainvillii* population, one recorded occurrence in 5-quad vicinity for *frontale* population.	Present
Birds			
Buteo regalis ferruginous hawk (wintering)	BCC/-- /WL	Inhabit open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon-juniper habitats. Not expected to nest on-site; suitable habitat not present. May forage on-site. Three recorded occurrences in 5-quad vicinity.	Moderate (foraging) Very low (nesting)
Athene cunicularia burrowing owl	--/CSC/--	Prefers to nest in intermediate grassland, desert, and scrubland habitats that has not been severely grazed and where few scattered bushes meet the grasslands. Dependent upon burrowing mammals, especially California ground squirrels. Suitable habitat present, and eight recorded occurrences in 5-quad vicinity (nearest is approximately 4 miles southeast).	Low
Accipiter cooperii Cooper's hawk (nesting)	--/--/WL	Inhabit open, interrupted, or marginal woodlands. Nest in riparian growths of deciduous trees. Not expected to nest on-site; suitable habitat not present. Observed flying over the site and may forage on-site. One recorded nesting occurrence within 5-quad vicinity.	Moderate (foraging) Very Low (nesting)

Table 3.3-2. Special Status Plant and Animal Species Potentially Occurring in the Project Vicinity

***Scientific Name/* Common Name**	***Regulatory Status Fed/State/ CNPS[2]***	***Habitat Description/Distribution in Project Area***	***Potential to Occur within Project Site***
Mammals			
Spermophilus mohavensis Mohave ground squirrel	--/ST/--	Restricted to the Mojave Desert. Inhabit open desert scrub, alkali scrub, and Joshua tree woodland. Will feed in annual grasslands. Prefers sandy to gravely soils and avoids rocky areas. Nests in burrows. Competition for burrows by California ground squirrels. Suitable-appearing habitat is present, and six previously recorded occurrences in 5-quad vicinity (nearest are approximately 1.5 miles north and south of the project site). Technically, the Project Site falls on or just outside the edge of the Mohave ground squirrel range. The site has a high degree of human disturbance and high usage by the competing California ground squirrel, a larger species tolerant of human disturbance and the Mohave ground squirrel is therefore not expected to occur on site nor is the habitat judged to be suitable for colonization by the species due to the degree of human disturbance on-site and in the vicinity and the prevalence of California ground squirrel.	Very Low
Onychomys torridus ramona Southern grasshopper mouse	--/CSC/--	Inhabit desert areas, especially scrub habitats with friable soils for digging and prefers low to moderate shrub cover. Suitable-appearing habitat exists within the project area. The only occurrence in the 5-quad area is from 1930 in Mint Canyon, approximately eight miles west)	Low

Notes:
1. Species and occurrence primarily derived from CNDDB (CNDDB 2008), the CNPS (2001), and the *West Mojave Habitat Conservation Plan* (BLM 2005).
2. The area included in these 5 USGS maps constitutes the "5-quad area" referenced in discussions of historic records of species occurrences.
3. Federal and State Listing:

BCC: Federal Bird of Conservation Concern
ST: State threatened
CSC: California Species of Special Concern
WL: CDFG's Watch List Species
1B: CNPS Plants considered Rare, Threatened, or Endangered in California and Elsewhere; Fairly threatened in California (moderate degree/immediacy of threat)

3.3.1.2.4 Plants

Botanical surveys were conducted by SAIC biologists in March, April, and May 2008. Surveys focused on sensitive species identified as having the potential to occur within the project site. No federally or state-listed endangered or threatened plant species were found or are expected to occur on the project site. However, suitable habitat is present within the project site for the short-joint beavertail (*Opuntia basilaris var. brachyclada)*. Additionally, Joshua Tree, a plant species protected by local plans and ordinances, is present within the project site.

Short-jointed beavertail (Opuntia basilaris var. brachyclada)

The short-jointed beavertail is primarily associated with Joshua tree, pinyon pine, and juniper woodlands, although it will also occur in chaparral and Mojave desert scrub communities (BLM 2005). It can be found in sandy to rocky well-drained soils, open streambeds, and on rocky slopes. This long-lived species is threatened

by habitat destruction as a result of suburban development and off-road vehicle use. This species was not recorded during three comprehensive botanical surveys (March – May 2008); however, suitable habitat is present within the entire project site and several individuals of this species were found off-site, approximately a quarter mile from the project site.

Joshua Tree (Yucca brevifolia)

Joshua trees are protected by the City of Palmdale Joshua Tree and Native Desert Vegetation Preservation Ordinance described under local policies and ordinances in Section 3.3.1.3.3. The Joshua tree is a tree-like member of the Yucca family. With its distinctive silhouette it is an emblematic species characteristic of broad areas of the Mojave Desert, including the vicinity of Palmdale, prior to development. As discussed in Section 3.3.1.2.1, Joshua Tree Woodland occurs within the project site principally in one remnant patch adjacent to the northern side of the Amargosa Creek channel. Joshua trees are also associated with California junipers on the site in the Mojavean Juniper Woodland community.

3.3.1.2.5 Wildlife

Seven specials status wildlife species have the potential to occur in the project area (Table 3.3-2) and are discussed below.

Silvery legless lizard (Anniella pulchra pulchra)

The silvery legless lizard is a California Species of Special Concern. This species can be found south of Contra Costa County and along the interior valleys in California (Stebbins 2003). Declining populations have resulted in a loss of approximately 20 percent of the historic range of this species (Jennings and Hayes 1994). Factors in habitat loss include urbanization, conversion of lands to intensive agriculture, coastal dune development, and the introduction of non-native plants, such as veldt grass (*Ehrharta calycina*), ice plant (*Carpobrotus edulis* and related species), eucalyptus, and other invasive species that displace native vegetation and create unsuitable microhabitat conditions for silvery legless lizards. This species is very limited in its mobility, inhabiting primarily the first foot of soil.

The silvery legless lizard is a small lizard with no legs, resembling a small snake (Stebbins 2003). The silvery legless lizard varies from metallic silver, beige, dark brown, to black in coloration on its dorsal surface. Ventrally, the coloration varies from whitish to bright yellow. There is also a dark line along the back and several thin stripes between scale rows. The species occurs in a wide variety of habitats in California, including sand dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, and/or oak trees. This species burrows into the loose soil under shrubs or trees and comes up near the soil surface during spring to feed and breed. During cold and hot and dry seasons the lizard remains burrowed deep in the soil.

Suitable habitat for the silvery legless lizard exists throughout the project site and the species is likely to occur. Silvery legless lizards are expected to occur within all habitats on the project site except on engineered slopes, where the soil is too compact. There are six recorded occurrences in a five-quad vicinity of the project site, the nearest approximately one mile west of the project site (CDFG 2008).

Coast (San Diego) horned lizard (Phrynosoma coronatum, blainvillii population) and Coast (California) horned lizard (Phrynosoma coronatum, frontale population)

The Coast horned lizard is a California Species of Special Concern. In northwestern Los Angeles County, the northern subspecies, *Phrynosoma coronatum,* frontale population, intergrades with the southern subspecies, *P.c.*, blainvillii population) (Brattstrom 1997). Genetic and geographical boundaries between the two

subspecies have not been recognized (Garcia and Associates 2006). Since a multivariate analysis of morphological and color-pattern characters could not distinguish the two subspecies, Montanucci 2004 concluded that the two populations cannot be distinguished in the field and should from this point forward be considered synonymous (and referred to as Coast horned lizard).

Habitat loss has occurred in many parts of this species' due to urbanization, including residential development and conversion of lands to cultivated agriculture. Other causes of habitat loss and fragmentation included fire, grazing, off-road vehicles, and depredation by domestic cats. One serious threat to Coast horned lizards is the elimination of their prey base (native ants) by exotic ants, which colonize disturbed soils and are associated with urbanization (Dudek 2003).

Coast horned lizards are active above-ground primarily between April and October with activity concentrated in April through June. This species is typically associated with sandy or gravelly substrates in a variety of arid and semi-arid scrub habitats including coastal dune scrub, chaparral, sandy washes and open woodland habitats. Essential elements of their preferred habitat include loose, fine soils, an abundance of ants or other insects, and open areas with a limited over-story for basking and low but relatively dense shrubs for refuge. During the winter, horned lizards aestivate underground in small mammal burrows, or in the soil under objects such as logs or rocks.

The Coast horned lizard is known to occur in the project area and suitable habitat exists within the project site. The Coast horned lizard is expected to occur within all habitats except engineered slopes, where the soil is too compact. During the April 2008 site visit, one individual (of undeterminable population) was observed.

Ferruginous hawk (wintering) Buteo regalis

The wintering ferruginous hawk is considered a Bird of Conservation Concern by the U.S. Fish and Wildlife Service (USFWS) and is on the CDFG's Watch List. It is also protected as a migrating bird species under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). Habitat destruction and fragmentation are the two major threats to the species. Other indirect threats include grazing, mining, fire, and the poisoning of prey (Dudek 2003). There are only a few recorded breeding occurrences for the ferruginous hawk in California; none occur within the West Mojave area (BLM 2005). According to Christmas Bird Count data, the highest number of wintering ferruginous hawks occur within the Antelope Valley, near the project site (BLM 2005).

The largest hawks in North America, ferruginous hawks have a rust-colored back and are mostly white underneath the wings and on the breast, belly, and tail (Bechard and Schmutz 1995). In California, ferruginous hawks do not breed, but do winter in grasslands, open fields, and agricultural areas (Dudek 2003). This species inhabits open habitats, including grasslands, sagebrush flats, desert scrub, low foothills, deserts, and fringes of pinyon-juniper scrub (Bechard and Schmutz 1995). The species will utilize, but does not require, trees for wintering (BLM 2005). The ferruginous hawk preys primarily upon black-tailed jackrabbits (*Lepus californicus*), ground squirrels *(Spermophilus* species), and prairie dogs (*Cynomys* sp.). Prey availability is the single most important factor in winter habitat selection.

The ferruginous hawk is known to winter in the project site vicinity, with three recorded occurrences in the five-quad vicinity (CDFG 2008). This species may forage over all on-site habitats.

Burrowing owl (Athene cunicularia)

The burrowing owl (*Athene cunicularia*) is considered a California Species of Special Concern. It is also protected as a migrating bird species under the MBTA (16 U.S.C. 703-711). A population census conducted by the Institute for Bird Populations from 2006-2007 detected 1, 756 pairs of burrowing owls in California,

with 94 pairs detected in the Western Mohave Desert (IBP 2008). Threats to burrowing owl populations include loss of habitat due to agricultural practices, poisoning by pesticides (targeting ground squirrels and weeds), indirect impacts from alteration of hydrology, and heavy recreational use of burrowing owl habitat (e.g., off-road vehicle use that compact soils) (Bates 2006).

The burrowing owl is a small owl, with long legs, a short tail, spots on its back, bars on its breast, and lacking ear tufts. It is easily distinguished from other owl species because it is the only owl commonly seen on the ground and during the day (Haug et al. 1993). The burrowing owl is active both day and night, with peak activity during dawn and dusk (BLM 2005). This species is a year-round resident of grasslands and sagebrush scrub in Southern California. It preys upon insects, scorpions, small mammals, birds, amphibians and reptiles by catching food with its feet. It hunts by walking, hopping, or running along the ground, or from a perch. The burrowing owl occupies burrows constructed by fossorial mammals (i.e., species adapted to digging and life underground) such as ground squirrels, badgers, or other small mammals (CBOC 1993). It may also utilize manmade structures, such as cement culverts, asphalt, or wood debris piles as burrows. Burrows may be used for breeding, wintering, foraging, and/or migration stopovers. The breeding season begins in late March and extends through June (BLM 2005).

Suitable burrowing owl habitat is present throughout most of the project site, particularly within the active channel, where there are an abundance of California ground squirrel burrows. The species would also be expected to occur within the Great Basin sagebrush scrub, Mojave mixed woody scrub, and Joshua tree woodland. There are eight recorded occurrences within the five-quad vicinity (CDFG 2008). The nearest recorded occurrence was in 2006, approximately four miles southeast of the project site.

Cooper's hawk (nesting) Accipiter cooperii

The (nesting) Cooper's hawk is on the California Department of Fish and Game's Watch List. A year-round resident of California, breeding populations of the Cooper's hawk have declined in recent decades, especially in areas of riparian woodland removal. Habitat destruction, as a result of urbanization and development, is the major threat to this species (Dudek 2003).

A medium-sized hawk, the Cooper's hawk has a dark gray or gray-brown back, red bars on a white breast, short wings, and a long, barred tail. This species is very similar to a sharp-shinned hawk, though it is larger with a proportionately longer tail (Rosenfield and Bielefeldt 1993). The Cooper's hawk nests in riparian growths of deciduous trees but will forage over open, grassland areas (Curtis et al. 2006). Cooper's hawks are tolerant of human activities near nests and have a small number of nests in the suburban Los Angeles area (BLM 2005). It preys primarily upon small passerine birds (up to 70 percent of its diet) and small mammal species. The Cooper's hawk hunts along woodland and habitat edges. It uses cover to hide, attack, and approach prey (Dudek 2003).

Suitable nesting habitat is not present within the project site. While evidence of foraging exists on-site (a tail feather of a Cooper's hawk was found on the project site), nesting Cooper's hawks are not expected to be affected by proposed actions and will not be discussed further in this document.

Southern grasshopper mouse (Onychomys torridus ramona)

The Southern grasshopper mouse is a California Species of Special Concern. Specific threats to and status of populations of this particular subspecies are unknown, though it has been suggested that the Southern grasshopper mouse subspecies suffers from threats similar to the Tulare grasshopper mouse (*Onychomys t. tularensis)* (Hafner et al. 1998), which is vulnerable to habitat loss (i.e., cultivation) and fragmentation. This is due to the species' low fecundity, low population density, and large home range.

The Southern grasshopper mouse is a short-tailed, stocky mouse with bicolored pelage; the upper parts are grayish to pinkish cinnamon and the underparts are white (McCarty 1975). In the field, it can be distinguished from similar species by its short, bulblike tail and large forefeet. In Southern California, this species inhabits desert areas in the Lower Sonoran Desert. Suitable habitat for the Southern grasshopper mouse includes scrub habitats with friable soils for digging. The Southern grasshopper mouse's diet consists of arthropods; prey items include scorpions, beetles, grasshoppers, pocket mice, and harvest mice; the Southern grasshopper mouse is important as a natural regulator of insect populations (McCarty 1975). Female Southern grasshopper mice have only one breeding season per year; this, paired with the highly territorial nature of male Southern grasshopper mice, contributes to the species living in relatively low densities in nature. The species is primarily nocturnal and remains active during the winter, with no period of hibernation. This species occupies burrows abandoned by other small mammals.

Suitable habitat exists within the project area for this species, though the only occurrence of the species in a five-quad area is from 1930 in Mint Canyon (approximately eight miles west of the project site) (CDFG 2008). The species is not expected to occur in the engineered slopes, where the soils are too compact. In addition, the species was not trapped during a two-night trapping surveys in April 2008.

Mohave ground squirrel (Spermophilus mohavensis)

The Mohave ground squirrel is listed as Threatened under the CESA; it is not listed under the ESA. Considered rare throughout most of its range, the Mohave ground squirrel's populations declined significantly between 1980 and 2000 (Hafner et al. 2008). The major cause of decline in Mohave ground squirrel populations is permanent loss of habitat by humans. Over 78 percent of the habitat within the species' range is either naturally unavailable or severely degraded. In addition, expanding ranges of competitive species, such as the round-tailed ground squirrel (S*permophilus tereticaudus*) may also affect populations, as the Mohave ground squirrel has low dispersal ability. In years of no reproduction, the home range of female Mohave ground squirrels varies in response to food availability. Due to large fluctuations in local population size and alternating sizes of home ranges, it is hard to determine a reliable population estimate; the total adult population size is unknown but expected to exceed 100,000 individuals.

The Mohave ground squirrel is a brown-colored ground squirrel without stripes or conspicuous markings. Compared to the California ground squirrel (*Spermophilus beecheyi*), the Mohave ground squirrel is smaller, with plain, unvariegated upperparts. The range of the Mohave ground squirrel is adjacent to (but not overlapping) the round-tailed ground squirrel (*S. tereticaudus*). Compared to the round-tailed ground squirrel, the Mohave ground squirrel's tail is white underneath and is shorter and fatter. In addition, the Mohave ground squirrel is large and its cheeks are brownish instead of white. The Mohave ground squirrel's distribution is restricted to sandy and gravely soils in a variety of habitats, including open desert scrub, alkali scrub, and Joshua tree woodland, within a 20,000 square kilometer area in the northwestern corner of the Mojave Desert. This species will also feed in annual grasslands. This species is diurnal (active during the daytime) and active from midwinter through early summer, aestivating (i.e. passes the summer in a dormant or torpid state) from summer until the following January or February (Best 1995). The Mohave ground squirrel is omnivorous; its diet consists mainly of forbs, seeds, and arthropods. Burrows of Mohave ground squirrels are often found in desert washes beneath desert willows (*Chilopsis linearis*) and nearby plants it consumes. The species will occupy several burrows at one time: a home (overnight) burrow, an aestivation burrow, and an accessory (mid-day) burrow.

There is a low likelihood that Mohave ground squirrels are present on the project site. Technically, the project site is located adjacent to the edge of the Mohave ground squirrel range as mapped by BLM in the West Mojave Plan Draft EIR/EIS (BLM 2005). The habitat to the south and west of the project site is hilly to mountainous and unsuitable for Mohave ground squirrels. Developed areas are located to the east and north of

the site; the site is surrounded by unsuitable habitat and isolated from other potential Mohave ground squirrel habitat. A recent status report (Laabs ca. 1999), citing CDFG data, indicates that:

> *"…the southern edge of the distribution of the species is limited by the abrupt rise of the San Bernardino and San Gabriel Mountains. Although the species likely occupied the Antelope Valley historically, widespread conversion of native habitats has apparently resulted in the extirpation of the species from west of Palmdale and Lancaster. Recent trapping records and observations are lacking in the southern portion of the range, between Palmdale and Lucerne Valley, and persistence of the species in this highly developed area is in question" (Gustafson, 1993).*

Limited areas of on-site suitable Mohave ground squirrel habitat exist within the Great Basin sagebrush scrub, active channel, and Joshua tree woodland. Marginal habitat exists within the Mojave mixed woody scrub.

The CDFG's Cumulative Human Impact Evaluation (CHIE) survey for Mohave ground squirrels was completed during the April 2008 site visit (see Appendix B-3); it was determined that the project site is heavily disturbed by humans. The CHIE survey evaluates the severity of disturbance of human impacts, including OHV use, existence of roads, horse or foot traffic, dog activity, urbanization, garbage dumping, mining activities, utilities, grazing, and native shrub disturbance, on Mohave ground squirrels. Additionally, definitive sightings of California ground squirrel were made during SAIC surveys on the flat eastern portion of the site and on the hilly western portion of the site. The presence of this larger ground squirrel, which dominates coastal and interior valley habitats, would further reduce the likelihood of Mohave ground squirrel being on the project site.

3.3.1.2.6 Wetlands

Generally, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Federal and State laws regulating development in streams and wetlands are summarized in Section 3.3.1.3, below.

The project site includes one small area of coastal and valley freshwater marsh and two areas of Great Valley willow scrub. These areas are associated with inflows from culverts conveying drainage from residential areas on the south side of Elizabeth Lake Road. The coastal and valley freshwater marsh occurs at an outlet to a concrete culvert conveying drainage from residential areas across Elizabeth Lake Road, approximately 750 feet east of the 25th Street Bridge (Figure 3.3-1). Dominant vegetation consists of cattail (*Typha* sp.), bulrushes (*Scirpus* spp.), and mulefat.

Great Valley willow scrub occurs at two outlets to concrete culverts conveying drainage from the neighborhood across Elizabeth Lake Road, approximately 750 feet and 1500 feet east of the 25th Street Bridge. Dominant species include red willow (*Salix laevigata*), sandbar willow (*Salix exigua*), mulefat, and occasional Goodding's willow (*Salix gooddingii*). Vegetation is relatively dense and there is very little understory.

Both of these wetland communities have clearly developed in response to the inflows of street drainage from the nearby neighborhood and would be expected to die out if water from that neighborhood were eliminated.

Common wildlife observed in these habitats during SAIC wildlife surveys in 2008 were Pacific treefrog, song sparrow, California quail, and Wilson's warbler. Additional bird species expected to occur within these habitats include migratory finches, orioles, and tanagers.

3.3.1.3 Regulatory Setting

3.3.1.3.1 Federal

Endangered Species Act (16 U.S.C. 1531 et seq.)

The ESA protects federally listed and proposed threatened and endangered species, and their designated critical habitats. Consultation with the USFWS and/or National Marine Fisheries Service (NMFS) is required under ESA Section 7 if listed species or their designated critical habitats would be adversely affected by a federal action. Section 9 of the Act prohibits the taking of listed species without authorization from the USFWS or NMFS.

Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) and Executive Order 13186

The Migratory Bird Treaty Act (MBTA) provides for the protection of migratory birds by making it illegal to possess, hunt, pursue, or kill migratory bird species unless specifically authorized by a regulation implemented by the Secretary of the Interior, such as designated seasonal hunting. Further, the MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11). Under certain circumstances, a depredation permit can be issued to allow limited and specified take of migratory birds.

Executive Order 13186 (effective January 10, 2001), outlines the responsibilities of federal agencies to protect migratory birds, in furtherance of the MBTA, the Bald and Golden Eagle Protection Acts, the Fish and Wildlife Coordination Act, and ESA. This order specifies the following:

- The USFWS as the lead for coordinating and implementing EO 13186;
- Requires federal agencies to incorporate migratory bird protection measures into their activities; and
- Requires federal agencies to obtain permits from the Service before any "take" occurs, even when the agency intent is not to kill or injure migratory birds.

Executive Order 13112 – Invasive Species

The National Invasive Species Management Plan was developed in response to this order in 1997. This order established the National Invasive Species Council (Council) as the leaders in development of the plan, and directs the Council to provide leadership and oversight on invasive species issues to ensure that federal activities are coordinated and effective. In addition, the Council has specific responsibilities including: promoting action at local, state, tribal, and ecosystem levels; identifying recommendations for international cooperation; facilitating a coordinated network to document, evaluate, and monitor invasive species' effects; developing a web-based information network on invasive species; and developing guidance on invasive species for federal agencies. The Council has developed nine plan priorities that provide direction for federal agencies. The plan priorities include: leadership and coordination of state and federal entities, prevention (a risk based approach), early detection and rapid response, control and management, restoration, international cooperation, research, information management, and education and public awareness. Additional details are available at: http://www.invaisvespecies.gov/council/.

Clean Water Act (33 U.S.C. Section 1251 et seq.)

The Clean Water Act (CWA) was enacted to restore and maintain the chemical, physical, and biological integrity of the United State's water through the elimination of discharges of pollutants. The CWA primarily

relates to water quality and is discussed in Section 3.7. However, Section 404 of the CWA also regulates discharge of dredged or fill materials into wetlands.

Executive Order 11990 – Protection of Wetlands

This Executive Order directs federal agencies to avoid to the extent possible long and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

This EO does not apply to the issuance of permits (by federal agencies), licenses, or allocations to private parties for activities involving wetlands on non-federal property.

Executive Order 11988 – Floodplain Management

This Executive Order directs federal agencies to avoid, to the extent feasible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development where there is a practicable alternative.

3.3.1.3.2 State

California Endangered Species Act (Fish and Game Code Section 2050 et seq.)

The CESA provides for recognition and protection of rare, threatened, and endangered plants and animal species. The Act requires state agencies to coordinate with the CDFG to ensure that state authorized/funded projects do not jeopardize a listed species. The Act prohibits the taking of a listed species without authorization from the CDFG.

California Lake and Streambed Alteration Program (Fish and Game Code Section 1600 et seq.)

The California Fish and Game Code, Sections 1600-1616, regulates activities that would alter the flow, bed, banks, channel, or associated riparian areas of a river, stream or lake—all considered "waters of the state." The law requires any person, state or local governmental agency, or public utility to notify CDFG before beginning an activity that will substantially modify a river, stream, or lake. Such alterations must also be evaluated under CEQA and authorized via a Streambed Alteration Agreement (SAA) by regional CDFG staff. A SAA is required when a project involves altering a stream or disturbing riparian vegetation, including any of the following activities:

- Substantially obstructing or diverting the natural flow of a river, stream, or lake;
- Using any material from these areas; and/or
- Disposing of waste where it can move into these areas.

A SAA specifies conditions and mitigation measures that implemented to minimize impacts to riparian or aquatic resources from the proposed project. Streambed protection measures may be extended by CDFG further into adjacent uplands given the particular circumstances surrounding a project.

Executive Order W-59-93 - California Wetlands Conservation Policy

In August 1993, the Governor announced the California Wetlands Conservation Policy. The goals of the policy are to establish a framework and strategy that:

- Ensures no overall net loss and achieves a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property;
- Reduces procedural complexity in the administration of state and federal wetlands conservation programs; and
- Encourages partnerships to make landowner incentive programs and cooperative planning efforts the primary focus of wetlands conservation and restoration.

The Executive Order also directed the California Resources Agency to establish an Interagency Task Force to direct and coordinate administration and implementation of the policy. The California Resources Agency and the departments within the agency generally do not authorize or approve projects that fill or harm any type of wetlands. Exceptions may be granted for projects meeting all the following conditions: the project is water dependent; there is no other feasible alternative; the public trust is not adversely affected; and the project adequately compensates the loss.

3.3.1.3.3 Local

City of Palmdale General Plan, Environmental Resources Element

The Environmental Resources Element of the City of Palmdale General Plan (adopted January 25, 1993) has goals, objectives, and policies pertaining to protection of significant ecological resources and ecosystems, including but not limited to, sensitive flora and fauna areas (Goal ER2) (City of Palmdale 1993). Policies refer to protection of identified Significant Ecological Areas (Policy ER2.1.1); promoting compatible recreational uses in SEAs (Policy ER2.1.2); soliciting funding to acquire significant wetland areas (Policy ER2.1.3); preserving natural drainage courses and riparian areas where significant concentrations of ecological resources exist (Policy ER2.1.4); and preserving and maintaining significant Joshua tree woodlands and other significant habitat areas (Policy ER2.1.5).

City of Palmdale Joshua Tree and Native Desert Vegetation Preservation Ordinance

Chapter 14.04 of the Palmdale City Code, entitled Joshua Tree and Native Desert Vegetation Preservation, preserves and protects desert vegetation, particularly Joshua trees, to retain the unique natural desert aesthetics in some areas of the city, and to promote the general welfare of the community. This ordinance applies all public and private property within the city which contains Joshua trees or other desert vegetation. The ordinance states that "*…the design of development projects should strive to protect and maintain the most desirable and significant of the healthy desert vegetation in a manner consistent with the city general plan and the California Environmental Quality Act (Ord. 952 §2 (part), 1992)*." This ordinance encourages on-site preservation of Joshua trees and junipers on site at a minimum of two trees per gross acre, and provides alternative methods of preservation should the required minimum not be achievable by on-site preservation.

3.3.2 Impacts and Mitigation Measures

3.3.2.1 Methodology

Vegetation mapping and surveys for special status biological resources were conducted at the project site. These surveys established the baseline conditions against which the impacts of the proposed project on biological resources are analyzed. The vegetation at the project site was mapped on a 2006 aerial photograph using visual interpretation of vegetation categories on the photograph coupled with site visits on March 12, April 16, April 17, and May 12, 2008. Vegetation categories were adapted from Holland (1986). Several land

cover types identified for this project site are not described in Holland. Wildlife species at the project site was surveyed during SAIC site visits site visits on March 12, April 16, April 17, and May 12, 2008. A complete list of wildlife species observed during SAIC site surveys is included in Appendix B-1). Small mammal trapping surveys were also conducted on April 16 and April 17, 2008 to ascertain the general small mammal populations. Details of these surveys are provided in Appendix B-2.

The impact assessment method generally consists of the following:

1. Identifying how different project activities and each alternative could affect biological resources;
2. Quantifying the effect of the project to the extent feasible (e.g., amount of habitat affected);
3. Applying the significance criteria; and
4. Determining the significance of impacts in accordance with the significance criteria.

The timing and duration of project activities are important in determining effects on biological resources since some species are present only part of the year and some are only sensitive to potential project site disturbance activities during certain phases of their lives, such as breeding. Information from other resource areas, such as surface water and groundwater analyses, is used in assessing impacts to biological resources. Mitigation measures are identified to enable avoidance, reduction, or compensation for the impact to the extent feasible.

3.3.2.2 Significance Criteria

Consistent with guidance provided in CEQA Guidelines *Appendix G* Environmental Checklist Form, the proposed project would have a significant impact on biological resources if it would result in one or more of the following conditions:

BIO-1: Have a substantial direct or indirect effect on plant or wildlife species identified for special status under local, state, tribal, or federal laws, regulations, or policies;

BIO-2: Have a substantial adverse effect on any natural vegetation community identified for special status under local, state, tribal, or federal laws, regulations, or policies, including wetlands;

BIO-3: Have a substantial adverse effect on native resident or migratory wildlife movement corridors, breeding or spawning habitats, and nursery habitats;

BIO-4: Cause a substantial disruption of local biological communities (e.g., from construction impacts or the introduction of noise, light, or invasive species); or

BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

BIO-6: Conflict with provisions of an approved local, state, tribal, or federal habitat or species conservation plan.

A review of the project application has determined that project development would not result in the exceedance of the following threshold criterion, and therefore is not discussed further:

- Conflict with provisions of an approved local, state, tribal, or federal habitat or species conservation plan.
    - *As no approved habitat or species conservation plans cover the project area, the project would not conflict with such plans or create significant impacts on biological resources covered under such plans.*

3.3.2.3 Proposed project

The proposed project would include construction of a 20-acre recharge facility, including recharge basins and infrastructure, off-channel recharge basins and water conveyance structures and in-channel recharge basins consisting of sand dams, and diversion pipelines to convey water to the off-channel recharge basins. The project would also conserve an approximately 22-acre native habitat conservation area north of the Creek and upstream from the 25th Street West Bridge, and a 3.2-acre Heritage Habitat Area, which would conserve and restore the best example of Joshua tree woodland on the property.

The project would also restore the disturbed biological communities on the south side of the creek and create a 38-acre nature park in which the native vegetation would be restored or enhanced with species native to the area. As part of nature park development, wherever possible, existing native plant species would be conserved on site, with priority going to those species with the longest lifespan and which require the greatest time to establish and reach maturity (i.e. Joshua tree, California juniper, Mormon tea, and peach thorn). Most of the habitats that would be directly affected by the project, including the Nature Park amenities, have been severely disturbed in the past by various activities including earthmoving, placement of fill, dumping, road development, sewer line installation and maintenance, and off-road vehicular recreation.

Table 3.3-3 provides a summary of short-term and long-term project effects on habitat. Long-term effects (about 21 acres) are related to development of diversion facilities, conveyance facilities, and recharge basins. Short-term disturbance (about 35 acres) is primarily associated with development of the Nature Park. Although potential impacts to sensitive features including coastal and valley freshwater marsh and great valley willow scrub during development of the Nature Park are accounted for in the short-term disturbance acreage below, it is assumed that impacts to these features would be minimized during development of the Nature Park because of their importance to the overall design. Approximately 31.4 acres are not included in the disturbance calculations. These include the 21.6-acre on-site conservation area as well as about 6.7 acres of active channel areas upstream and downstream from the diversion structure and in-channel recharge basins, and the approximately 3.2 acre Heritage Habitat Area. In these areas the biological disturbance associated with planned restoration and maintenance activities, including trash removal and invasive species control, would be minor and as a result they were not included in the disturbance calculations.

Table 3.3-3. Potential Vegetation and Wildlife Habitat Disturbances Resulting from the Project

Vegetation Description	*Map Key*	*Total Acres*	*Long Term Disturbance (acres)*	*Short Term Disturbance (acres)*
Great Basin Sagebrush Scrub	SS	17.0	5.1	11.6
Disturbed Joshua Tree Woodland	DJT	12.5	6.7	5.0
Mojavean Juniper Woodland and Scrub	JW	12.2	0.0	0.0
Active Channel	AC	12.1	5.2	0.6
Engineered Slope	ES	12.0	0.6	11.0
Disturbed		8.6	2.8	4.8
Mojave Mixed Woody Scrub	MW	8.5	0.1	0.1
Joshua Tree Woodland	JT	1.9	0.1	0.1
Weed-dominated	W	1.2	0.0	1.2
Great Valley Willow Scrub	WS	0.6	0.1	0.3
Coastal and Valley Freshwater Marsh	FWM	0.1	0.0	0.1
	Total Acres	**86.9**	**20.7**	**34.8**

Impact BIO-1: The proposed project could potentially result in the loss of individuals or habitat of special status plants and wildlife.

Plants. The proposed project would result in direct and indirect impacts to one special status plant species, Joshua trees (protected by City of Palmdale policies and a City ordinance) through mortality of individuals, habitat loss, and/or temporary disturbance to their habitat. In addition, suitable habitat for the short-jointed beavertail cactus is present in the project site.

The project site contains 1.9 acres of Joshua tree woodlands and 12.5 acres of disturbed Joshua tree woodland habitat. The proposed project would result in the direct disturbance of 0.2 acres to Joshua tree woodlands of which 0.1 acres would be long-term disturbance (due to operations) and 0.1 would be short-term disturbance (due to project construction). In addition, the proposed project would result in the short-term disturbance (due to project construction) of 12.5 acres and the long-term disturbance (due to project operations) of 6.7 acres. Project impacts on this special status plant species would be *significant.* Impacts on Joshua trees, are discussed under Impact BIO-5.

Several individuals of the short-jointed beavertail were located within Mojavean juniper woodland and scrub habitat approximately 1,320 feet from the project site. Since this species was not observed on-site and is visible during any season, it is reasonable to assume this species is not present on the project site and would not be affected by the project. Furthermore, the community with which the species is associated (Mojavean juniper woodland and scrub) would be located within the proposed native habitat conservation. Therefore, impacts on this special status plant species would be *less than significant.*

Wildlife. Construction activities for the proposed project could directly affect special individuals or populations of special status wildlife species through mortality of individuals, habitat loss, and/or temporary disturbance to their habitat. Special status species could be affected by construction if individuals were present within the construction area or if construction resulted in degradation of habitat through direct removal of native vegetation, sedimentation, or erosion.

Mohave ground squirrel are not likely to be present within the project area, due to the high degree of human disturbance on-site and surrounding development, prevalence of California ground squirrels on the project site, and the site's location along the periphery of the population's documented distribution. Therefore, the project would result in *less than significant* impacts to this species. However, in the unlikely event that Mohave ground squirrels are found on-site, impacts would be *potentially significant*.

Of the other sensitive species potentially occurring on-site (Table 3.3-2), only the Coast horned lizard is known to be present within the project site and is associated with Great Basin sagebrush scrub habitat that is found on-site. This species could be directly affected by project construction activities. However, anticipated project impacts would not adversely affect the overall population of this species because of the small amount of habitat that would be adversely affected, the large amount of habitat on site that would be conserved, restored or enhanced, and the small number, if any, individuals expected to be lost. Therefore, impacts to the Coast horned lizard would *less than significant*.

Special status species associated with Great Basin sagebrush scrub including, Coast horned lizard, burrowing owl silvery legless lizard, burrowing owl, and Southern grasshopper mice, which are California species of special concern, could be present on the site. Additionally, wintering ferruginous hawks (Federal Bird of Conservation Concern and CDFG Watchlist species) and Cooper's hawk (CDFG Watchlist species) may fly overhead and possibly forage on the project site. Most project activities would occur in Great Basin sagebrush scrub, disturbed Joshua tree woodland, recently disturbed habitats, and active channel (Table 3.3-4). Project construction activities could result in impacts to these species through direct injury or mortality and alteration of the Great Basin sagebrush scrub habitat. Although the loss of approximately 21 acres of on-site habitat would be substantial, the project would preserve approximately 22 acres of on-site native habitat (Juniper Woodland and Scrub and Mojave Mixed Woody Scrub) and restore and maintain approximately 38 acres of native habitat in the community nature park (Figure 2-3). As such, impacts to the silvery legless lizard,

Southern grasshopper mouse, ferruginous hawk, and Cooper's hawk would be *less than significant* because only a small amount of habitat would be affected and few if any individuals would potentially be lost, resulting in no substantial effects on their population.

As discussed above, suitable burrowing owl habitat is present throughout most of the project site, particularly within the active channel, where there are an abundance of California ground squirrel burrows. The species would also be expected to occur within the Great Basin sagebrush scrub, Mojave mixed woody scrub, and Joshua tree woodland. However, the potential for this species to occur on-site is low due to the high degree of human disturbance on-site. As such, the project would result in *less than significant* impacts to this species. In the unlikely event that burrowing owls are found on-site, impacts would be *potentially significant*.

Mitigation Measures

BIO-1 A Biological Resources Protection Plan shall be prepared and implemented to minimize or avoid impacts to special status wildlife species during project construction. Habitat and species protection measures shall include, at a minimum:

1. Prior to site grading, a presence/absence focused survey for sensitive species, including coast horned lizards and the burrowing owl (*Athene cunicularia*) shall be conducted on the project site by a qualified biologist under the direction of the City of Palmdale Planning Department. Individual horned lizards shall be removed from the construction area, prior to construction, and relocated to a portion of the site not scheduled for development. If the burrowing owl is determined to be present, protective measures shall be implemented to ensure compliance with the Migratory Bird Treaty Act and other relevant Fish and Game Code requirements. The protective measures may include closure of burrows used by wintering birds prior to construction and are to be developed by a qualified biologist;

2. Prior to grading, the City of Palmdale shall consult with the CDFG concerning the suitability of the habitat for the Mohave ground squirrel. If the habitat is determined to be suitable and the Mohave ground squirrel(s) are assumed to be present on the project site, mitigation for the impact to Mohave ground squirrel shall be provided with concurrence from CDFG. As outlined in the City of Palmdale General Plan, Natural Resources Element (Palmdale Planning 1993), the City of Palmdale shall cooperate with the implementation of the West Mojave Coordinated Management Plan for protection of the Mohave ground squirrel (Policy ER2.2.1 in General Plan). Mitigation may be provided as outlined in the March 29, 2006, correspondence by the City committing to mitigation for impacts to the Amargosa Creek in conjunction with the Operational Law Letter proposed for the project *in lieu* of the Streambed Alteration Agreement

3. A qualified biologist with the appropriate permits shall be present during construction in habitats that support special status species. Any special status species, including coast horned lizards or silvery legless lizards, encountered during vegetation clearing shall be removed from the construction area, prior to construction, and relocated to a portion of the site not scheduled for development.

4. The project engineer shall clearly delineate limits of construction and, with the input of the project biologist, may designate "sensitive resource zones" on the project maps and construction plans. Sensitive resource zones are defined as areas in which construction would be limited in space, time, or methods to minimize or avoid impacts to special status species or their habitat;

5. Heavy equipment and construction activities shall be restricted to the defined limits of construction. Construction vehicles and personnel shall use existing access roads. All worker parking shall be off-site or within designated on-site areas approved by the project engineer and project biologist.

Plan Requirements and Timing: The Biological Resource Protection Plan shall be included in the final construction plans.

MONITORING: The City of Palmdale shall ensure that the measure is included in the construction plans and is implemented.

Significance of Impacts after Mitigation

Residual impacts would be *less than significant* with implementation of **Mitigation Measure BIO-1 and BIO-5.1 and 5.2.**

Impact BIO-2: The proposed project would affect natural vegetation communities identified for special status under local, state, tribal, or federal laws, regulations, or policies.

Native Desert Scrub Communities. Impacts on native desert scrub communities, which are protected by City of Palmdale policies and a city ordinance, are discussed below under Impact BIO-5.

Drainage Courses, Riparian Habitat and Wetlands. Implementation of the project would affect the drainage course of Amargosa Creek, along with small amounts of riparian scrub and wetland habitat. Activities in drainage courses, riparian areas, and associated wetlands are regulated by the California Department of Fish and Game (California Fish and Game Code, Sections 1600-1616) and activities within drainage courses require a Stream Alteration Agreement from the California Department of Fish and Game. Additionally, the City of Palmdale's General Plan Policy ER2.1.4 is to: *Preserve natural drainage courses and riparian areas where significant concentrations of ecological resources exist*. Although activities in drainage courses commonly fall under the regulatory authority of the Army Corps of Engineers under the Clean Water Act, the Corps considers the Amargosa Creek watershed, including tributaries and Rosamond Dry Lake, to be "isolated, non-navigable water bodies that do not support substantial interstate commerce. Under SWANCC these drainages are not considered waters of the U.S. and are not regulated by the Corps" (USACE 2007).

Construction of the proposed project would result in a temporary disturbance to riparian communities and habitat along Amargosa Creek within the project area. The project site includes approximately 14.5 acres of stream channel, riparian, and wetland habitat, comprised of active channel (12.1 acres), Great valley willow scrub (0.6 acre), and coastal and valley freshwater marsh habitats (0.1 acre), and disturbed (i.e., riprap or concrete-lined) channel areas (1.7 ac—included in Table 3-4 under recently disturbed areas). Approximately 5.2 acres of the active channel would be subject to long-term disturbance associated with development and operation of in-channel recharge basins and diversion structures upstream from the 25th Street West Bridge. As part of the proposed project a severely eroded tributary gully leading from a culvert under 25th Street West and north of Amargosa Creek will be repaired and the culvert extended and rerouted to enter Amargosa Creek on the downstream side of the bridge with appropriate measures to dissipate energy and prevent erosion at the outlet. This will lead to reduced sedimentation in the creek downstream of the inflow. In-channel construction would occur during the dry season when no little or no surface water would be present in the mainstem of Amargosa Creek. Small amounts of great valley willow scrub habitat (0.3 acres) and coastal and valley freshwater marsh habitat (0.1 acre) are within the Nature Park area. These are listed as temporarily disturbed because they would be subject to restoration activities as part of the Nature Park; however these features, which are supported by runoff from adjacent neighborhoods south of Elizabeth Lake Road, would be retained

in the Nature Park design. Due to the scale of the project facilities in the stream channel and their long-term anticipated operation, impacts on drainage courses, riparian, and wetland habitats would be *significant.*

Mitigation Measures

BIO-2 The Biological Resources Protection Plan identified in **BIO-1**, shall include the following measures to minimize or avoid impacts to Amargosa Creek and associated riparian and wetland habitat.

1. The project engineer shall clearly delineate limits of construction and, with the input of the project biologist, shall designate portions of the Amargosa Creek channel outside of the proposed in-channel diversion and recharge basins, as "sensitive resource zones" on the project maps and construction plans. The areas of great valley willow scrub and coastal and valley freshwater marsh habitats on site will be included in the mapping of sensitive resource zones. Sensitive resource zones are defined as areas in which construction would be limited in space, time, or methods to minimize or avoid impacts to creek channel, riparian, or wetland habitat.

2. All construction equipment shall be stored and fuelled in designated locations at least 100 feet (30.5 meters) away from Amargosa Creek and in areas approved by the project biologist.

3. The stream corridor and riparian and wetland habitat associated with culvert inflows shall be included in a project invasive species control program, specifically including eradication of existing tamarisk (an invasive non-native species) on site and maintaining the site free of tamarisk during project operations.

4. The project will obtain and comply with applicable permits, including the CDFG Stream Alteration Agreement.

Plan Requirements and Timing: The Biological Resource Protection Plan shall be included in the final construction plans.

MONITORING: The City of Palmdale shall ensure that the measure is included in the construction plans and is implemented.

Significance of Impacts after Mitigation

The residual impact on stream channel, riparian, and wetland habitats would be *less than significant*. No permanent loss of riparian habitat and wetlands would occur. In addition, the project areas between Elizabeth Lake Road and Amargosa Creek would be enhanced and restored by revegetation with plant species native to the Amargosa Creek watershed as part of the Nature Park development, providing a buffer between Elizabeth Lake Road and the creek.

Impact BIO-3: Construction activities could adversely affect wildlife migration or breeding habitat for migratory birds and wildlife.

Migratory/Breeding Birds. Proposed construction activities would result in removal of native and non-native shrubs that provide cover, roosting, and nesting habitat for common wildlife and migratory birds. Raptors and other bird species protected under the MBTA may use dense woody species including Joshua tree and California juniper for nesting and perch sites. Nesting of migratory species may also occur on-site within Great Basin sagebrush scrub, Great Valley Willow Scrub, Joshua Tree Woodland, Mojavean Juniper

Woodland and Scrub, and Mojave Mixed Woody Scrub habitats. The breeding season for raptors and other bird species can begin as early as mid-February and continue through August, while the season for smaller resident and migratory birds can extend from mid-March through August. If removal of these vegetation types occurred within the breeding seasons for the affected species, reproductive success of the individuals nesting there would be adversely affected. Nests could be lost during vegetation clearing, and noise and human activities within the construction corridor could cause birds nesting in adjacent habitat to abandon their nests. Disruption and loss of nesting for migratory birds would be considered a *significant* impact.

Wildlife Corridors. Project construction activities and operations could adversely affect wildlife migratory corridors by creating physical barriers to movement of terrestrial and/or aquatic wildlife.

Construction activities would occur during the day, allowing terrestrial animals to move freely along Amargosa Creek and across the project site at night, when mammal activity is the greatest. During operations the proposed in-channel recharge basins would not impede wildlife movement along the Amargosa Creek channel. Operation of the proposed off-channel recharge basins would result in the long-term reduction of on-site foraging habitat . However, during operations upland wildlife species would be able to move freely along the periphery of the in-channel and off-channel recharge basins , allowing animals to move freely across the Amargosa Creek channel. Furthermore, on-site habitat conservation and restoration activities would maintain and improve cover for wildlife species in areas along the Amargosa Creek channel. As no terrestrial wildlife migration or movement corridors would be affected during construction or operations, impacts would be *less than significant*.

The project could affect habitat and movement corridors for aquatic species by altering the magnitude and duration of downstream flows and maintaining water on-site in recharge basins for longer periods than existing conditions. During periods of high stormwater flows, diversion would begin after the sediment load has been reduced to acceptable levels for recharge and sufficient flow had been released downstream for habitat maintenance. Diversion activities would reduce the magnitude and duration of stormwater flows downstream from the project site. Amargosa Creek stormwater flows are intermittent and ephemeral and do not support aquatic wildlife species in the project area. As no sensitive aquatic species are expected to occur within the project area and downstream dispersal of aquatic wildlife species is substantially limited, construction impacts to aquatic wildlife movement would be *less than significant*.

During operations, the proposed in-channel and off-channel recharge basins would sustain water on-site for longer periods compared to existing conditions. This could enable aquatic invertebrates to complete their life cycles and provide foraging habitat for migratory and wintering water bird populations. Because the water would only be present during the rainy season, there would not be habitat conditions conducive to supporting fish or aquatic vertebrate populations. In some years it is likely that water would be present to support amphibian species such as Pacific chorus frog that require temporary sources of water for breeding. Provision of seasonal habitat for migratory and wintering water bird populations would be a *beneficial effect* that partially offsets the loss of habitat for native wildlife species associated with construction of the recharge facilities.

Mitigation Measures

BIO-3 The following shall be incorporated into the Biological Resources Protection Plan (**Mitigation Measure BIO-1**) to avoid or reduce impacts to migratory and resident breeding birds and to reduce effects on wildlife movement:

1. Vegetation removal and preliminary grading required for project construction shall be accomplished during the season when avian species are not nesting (i.e., between September 1 and February 15). This will avoid direct impacts on nesting species by removing the habitat

when they are not present. Should additional vegetation removal be required during the potential nesting season, a qualified biologist shall be retained to conduct pre-construction nesting bird surveys during the nesting season in areas that would require the direct removal of native vegetation where suitable nesting habitat for resident or migratory bird species may occur. The surveys shall focus on breeding behavior and potential nesting locations in the proposed work area and immediately adjacent to that area. Based on the results of the surveys, recommended buffer areas between construction activities and observed nesting habitat, if present, shall be provided to the resident engineer if the work were scheduled to occur near those locations while nesting is potentially occurring (February 15 through August 31) or construction in the vicinity of the nesting locations could be delayed until after the young have fledged and left the nest.

2. A qualified biologist shall be present during removal of vegetation to ensure that breeding wildlife and nesting birds are not harmed. The biologist shall have the authority through the on-site project manager to redirect or temporarily stop work if threats to the species are identified during monitoring;

3. All nighttime lighting associated with the bike path or other project facilities shall be low profile and directed away from the Amargosa Creek channel and adjacent habitats to the maximum extent feasible.

Plan Requirements and Timing: This measure shall be included in the final construction plans and specifications.

MONITORING: The City of Palmdale shall ensure that these measures are included in the construction plans and are implemented.

Significance of Impacts After Mitigation

Implementation of **Mitigation Measure BIO-3, Mitigation Measures BIO-1.1,** and **BIO-1.2** would minimize impacts on migratory bird and wildlife breeding and movement and reduce impacts to *less than significant*.

Impact BIO-4a: Project implementation could cause disruption of local plant or wildlife communities due to project construction impacts.

The proposed project would result in the long-term loss of approximately 21 acres of vegetation (Table 3-4) for the construction of the recharge facilities including the following native vegetation communities: Great Basin Sagebush scrub, Joshua tree woodland, Mojave misted woody scrub, Great Valley willow scrub, and coastal and valley freshwater marsh habitat. Most of the area that would be affected by construction of off-channel recharge basins has been severely disturbed by past earthmoving and other activities that have eliminated or greatly diminished the cover of long-lived native plant species in the upland terraces where the off-channel recharge basins are proposed. The area that would be affected by in-channel recharge basins is principally open sandy to gravelly intermittent stream bed with little persistent vegetation and no mature native trees or shrubs. The proposed project would include the creation and maintenance of a 38-acre nature park, including extensive habitat enhancement and restoration, and the setting aside of a 22-acre native habitat conservation area, characterized by existing mature California juniper and native desert scrub plant communities, and maintenance of over six acres of active stream channel. These features, amounting to approximately 66 acres of habitat would continue provide habitat for native vegetation and wildlife. In the case of the Nature Park, the overall habitat quality would be substantially improved compared to its largely disturbed condition today by restoration activities that would establish greater cover of native shrubs and trees

and continued management. The proposed project construction and restoration activities would result in only temporary disturbance to desert and riparian habitats and would not substantially disrupt local plant communities or wildlife. Therefore, the impacts would be *less than significant* because these plant communities are common and widespread in the region, the amount affected would be small, and most effects would be short term. Clearing of weed-dominated areas would have *less than significant* impacts on these common, non-native plant communities and would be beneficial to the ecological status of the site. Work in disturbed and developed areas would not adversely affect plant communities. Impacts to riparian habitat are addressed in **Impact BIO-2**.

The vegetation types in the proposed project area provide wildlife habitat and also help to prevent soil erosion that could affect plant communities and wildlife within the active channel. Impacts to common wildlife would be *less than significant* due to the small area affected, short duration of the work at any one location, and habitat enhancement/restoration to plant communities that can be used by wildlife during site restoration.

Mitigation Measures

Because impacts would be less than significant, no mitigation is recommended.

Significance of Impacts After Mitigation

The residual impact would be *less than significant*.

Impact BIO-4b: Construction and operations activities could disrupt local plant communities through the introduction or spread of invasive species.

Indirect impacts to local plant communities include the introduction or spread of invasive species from disturbance of natural vegetation communities. Construction activities associated with the proposed project could result in the spread of invasive non-native plant species, such as tamarisk (*Tamarix* sp.) and cardaria or hoary cress (*Cardaria* sp.), which are already present on-site. In addition, invasive non-native plant species could be introduced from vehicles and equipment coming from other construction sites. Invasive or pest species of concern in the project area include plant species listed as invasive by the California Invasive Plant Council (CalIPC) or listed as Noxious Weeds by the Department of Agriculture and Food (DAF). Plant species of concern may also those noted by local authorities as invasive in the West Mojave area. Areas where vegetation has been removed during construction and not revegetated following construction or during operations would be most vulnerable. Proposed revegetation and habitat restoration activities will help prevent the recruitment of non-native invasive plan species during construction and operations. In addition, the project would remove existing non-native tamarisk from the project site. The potential for establishment or spread of invasive non-native species during construction and operation is considered a *significant* impact.

Mitigation Measures

BIO-4b.1 Areas of tamarisk and cardaria infestation on-site shall be identified and mapped prior to construction. All such areas within construction areas, including the Nature Park, shall be marked on the construction plans and clearly flagged in the field.

Plan Requirements and Timing: This measure shall be a condition of project approval and shall be implemented prior to the beginning of construction. The locations of invasive plant infestations shall be included in the final construction plans.

MONITORING: The City of Palmdale shall ensure that the measure is included in the construction plans and is implemented.

BIO-4b.2 Prior to construction and throughout restoration, invasive non-native species, specifically including tamarisk and cardaria, shall be treated and controlled. Pre-project treatment shall encompass all areas of the project property where construction equipment will be operating, including the proposed Nature Park. Treatment shall commence sufficiently in advance of initial earthmoving to kill existing plants and infestations on-site, minimizing the chance for their spread on site as a result of earthmoving activities. Treating before construction is intended reduce the amount of viable seed or plant parts capable of resprouting that could be spread by construction thereby minimizing the potential for resprouting or spread of the species following earthmoving activities. Monitoring and treatment shall continue a minimum of three times per year, but up to five times per year until all of the performance criteria in the Nature Park Revegetation Plan have been met.

Plan Requirements and Timing: This measure shall be a condition of project approval and shall be implemented prior to the beginning of construction.

MONITORING: The City of Palmdale shall ensure that the measure is included in the construction plans and is implemented.

BIO-4b.3 Unless access is refused by the property owner, adjacent areas of invasive non-native plant species infestation, specifically including but not limited to tamarisk and cardaria, on lands adjacent to the proposed project site shall be treated to reduce their growth and reproduction, to minimize the potential for re-infestation of the project site.

Plan Requirements and Timing: This measure shall be a condition of project approval and shall be implemented prior to the beginning of construction.

MONITORING: The City of Palmdale shall ensure that the measure is included in the construction plans and is implemented

BIO-4b.4 The proposed project Plan shall include an invasive non-native plant species control component to address invasive non-native plant species removal within the Nature Park, Recharge facilities, and on-site conservation areas. The Plan shall also establish performance criteria for distribution and density of invasive non-native plant species infestations.

Plan Requirements and Timing: This measure shall be included in the final construction plans.

MONITORING: The City of Palmdale shall ensure that the measure is included in the construction plans and is implemented.

Mitigation Measures BIO-4b.5 and **BIO-4b.6** are recommended to reduce operational impacts.

BIO-4b.5 A "weed manual" shall be prepared prior to operation and maintenance activities that shall include photographs of the different invasive non-native plant species that are present on the project site or similar habitats in the project vicinity, including tamarisk and cardaria. The weed manual shall be distributed to operations personnel, including technicians managing the recharge facilities and crews performing restoration and maintenance activities. These personnel will be instructed to look for invasive non-native plant species infestations along the access roads and at structures. Invasive non-native plant species infestations identified shall be treated or removed.

Plan Requirements and Timing: This measure shall be included in the operations plan for the project and shall be implemented upon completion of construction.

MONITORING: The City of Palmdale shall ensure that the measure is included in the construction plans and is implemented.

BIO-4b.6 A biologist shall inspect the project site, including access roads, recharge basins and berms, at least annually for invasive non-native plant species as part of regular monitoring and maintenance activities. If invasive non-native species are found, they shall be removed using the methods provided in the proposed project Plan, or currently accepted methods. In addition, it is recommended that vehicles be washed or inspected by City of Palmdale personnel after driving through areas with identified invasive non-native plant species infestations prior to using the vehicles elsewhere to prevent the spread of those invasive non-native plant species to other areas.

Plan Requirements and Timing: This measure shall be included in the operations plan for the project and shall be implemented upon completion of construction.

MONITORING: The City of Palmdale shall ensure that the measure is included in the construction plans and is implemented

Significance of Impacts After Mitigation

With implementation of **Mitigation Measures BIO-4b.1** through **BIO-4b.6**, residual impacts would be *less than significant*.

Impact BIO-5: Removal of California juniper and Joshua trees and associated native vegetation would conflict with local policies or ordinances.

Construction of project facilities, chiefly the recharge basins, will result in the unavoidable removal of approximately ten individual Joshua trees and a similar number of California junipers. The individual trees that would be affected are located in severely disturbed habitat, principally mapped as disturbed Joshua tree woodland, which supports scattered remnant individuals of Joshua tree and California juniper. The more or less intact Joshua tree woodland remaining on-site is proposed for preservation and restoration on-site as the 3-acre Heritage Habitat area, which is part of the proposed 38-acre Nature Park.

Construction of the proposed project is consistent with applicable goals, policies, and objectives outlined in Section 2 of the *City of Palmdale General Plan* (*General Plan*), Environmental Resources Element (City of Palmdale 1993). The project site is located outside Significant Ecological Areas mapped in the *General Plan.* The project includes a 22-acre conservation area and a 3-acre Heritage Habitat area, which together cause the only intact habitat areas supporting Joshua trees and California junipers to be conserved on-site. Moreover, the 38-acre Nature Park would include the enhancement and restoration of previously disturbed habitat to remove non-native vegetation and restore native Mojave Desert scrub, riparian vegetation, and wildlife habitat. As part of the Nature Park development, wherever possible existing native plant species would be preserved on site, with priority going to those species with the longest lifespan and which require the greatest time to establish and reach maturity. These species include Joshua tree, California juniper, Mormon tea, and peach thorn. This is consistent with City of Palmdale Policy ER2.1.5 to "*preserve and maintain significant Joshua tree woodlands and other significant habitat areas*."

The on-site conservation and restoration of native communities containing Joshua tree and California juniper proposed as part of the project is consistent with the City of Palmdale Native Desert Vegetation Ordinance (Chapter 14.04 of the Palmdale City Code, entitled Joshua Tree and Native Desert Vegetation Preservation), which states that *"…the design of development projects should strive to protect and maintain the most desirable and significant of the healthy desert vegetation in a manner consistent with the city general plan and the California Environmental Quality Act. (Ord. 952 §2 (part), 1992).*" This ordinance encourages on-site

preservation of Joshua trees and junipers on site at a minimum of two trees per gross acre, and provides alternative methods of preservation should the required minimum not be achievable by on-site preservation.

Because of their age, ecological importance, and contribution to community identity, loss of individual California juniper and Joshua trees would result in a *significant impact*.

Mitigation Measures

BIO-5.1 Juniper and Joshua trees shall be avoided to the maximum extent feasible. The project site shall be surveyed and all Joshua trees and California junipers will be marked and enumerated as specified in the City of Palmdale Native Desert Vegetation Ordinance. Protections shall be consistent with those specified in the Ordinance and may include financial incentives and penalties, and creation of exclusion zones. Trees that may be removed and those that must be protected shall be clearly shown on project plans and marked in the field. The construction plans and specifications shall include financial compensation to the construction contractor for avoiding Joshua trees and California junipers that would be permitted to be removed and financial penalties for removing trees that are designated for protection. Financial compensation shall minimally be the estimated cost of mitigating loss of that tree (planting, monitoring, maintenance, and reporting to attain three trees that meet performance criteria for each tree removed). Financial penalties shall be minimally two times the compensation amount. Exclusion zones shall be created within the nominal construction easement to protect groups of trees where feasible.

BIO-5.2 Individual Joshua trees that cannot be avoided during construction shall be salvaged and transplanted if feasible in an on-site location specified in the plans for the Nature Park restoration. Salvage and transplantation methods, their feasibility, and likelihood of success shall be as determined by the City Arborist or a qualified independent landscape contractor. In the event that salvaging and transplanting is not feasible, one or a combination of the following two mitigation measures shall be implemented: 1) Joshua trees planted at unnaturally high densities in a portion of the site as mitigation for other projects shall be transplanted in the Nature Park area as part of the restoration; and/or 2) The Nature Park shall accept salvaged desert species from other projects (primarily Joshua trees and cacti).

Plan Requirements and Timing: This measure shall be included in the final construction plans.

MONITORING: The City of Palmdale shall ensure that the measure is included in the final construction plans and is implemented.

Significance of Impacts after Mitigation

Implementation of **Mitigation Measures BIO-5.1 and BIO-5.2** would ensure consistency with local environmental resource and native tree protection policies. The residual impact on native desert vegetation, California juniper, and Joshua trees would be *less than significant*.

3.3.2.4 Alternative 1 –No In-Channel Recharge Basin

The No In-Channel Recharge Basin Alternative would eliminate biological resource impacts associated with the in-channel recharge basins located west of 25th Street West/Highland Avenue and north of Elizabeth Lake Road. This alternative would involve the same construction and operation of facilities as the proposed project with the exception of the in-channel recharge basins. As such, impacts on biological resources would be similar in nature to, but slightly less than those described for the project. As with the proposed project,

implementation of this alternative would result in less than significant impacts on aesthetics/visual resources with the implementation of **Mitigation Measures BIO-1, BIO-2, BIO-3, BIO-4b.1 through 4b.6, BIO-5.1 and BIO-5.2**. Overall, the biological impacts of the No In-Channel Recharge Basin would be similar to the proposed project although somewhat lower because of the lack of in-channel basins.

3.3.2.5 Alternative 2 – Reduced Off-Channel Recharge Basin

The Reduced Off-Channel Recharge Basin Alternative would eliminate three off-channel basins in the eastern portion of the project site and instead restore the unused areas as native habitat. This alternative would involve the same construction and operation of facilities as the proposed project with the exception of the three off-channel recharge basins, which would reduce construction time somewhat. This alternative would reduce biological resource impacts associated with the construction and operation of these three recharge basins. Additionally, the restoration of these areas would provide a beneficial biological resources impact. Thus, impacts on biological resources would be similar in nature to, but less than those described under the proposed project. As with the project, implementation of this alternative would result in less than significant impacts on biological resources with the implementation of **Mitigation Measures BIO-1, BIO-2, BIO-3, BIO-4b.1 through 4b.6, BIO-5.1 and BIO-5.2**.

3.3.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

The Alternative Aqueduct Diversion Pipeline Alignments Alternative would change the location and the length of the aqueduct diversion pipeline. This alternative would involve the same construction and operation of facilities as the proposed project; however construction would occur over a shorter distance because of the reduced pipeline length. Although development under this alternative would reconfigure the size and location of the aqueduct diversion pipeline, impacts on biological resources would be generally equivalent to the proposed project. As with the Project, implementation of this alternative would result in less than significant impacts on biological resources with the implementation of **Mitigation Measures BIO-1, BIO-2, BIO-3, BIO-4b.1 through 4b.6, BIO-5.1 and BIO-5.2**.

3.3.2.7 Alternative 4- No Project Alternative

Given existing zoning, the No Project Alternative would involve the construction of approximately 280 residential units on lots of 7,000 square feet or greater on approximately 50 acres of the 87 acre site. This would involve installation of streets, utilities, and construction of houses on areas above the flood plain of Amargosa Creek. The Nature Park Facility including the Habitat Enhancement/Restoration area would not be developed as part of the No Project Alternative. However, the Native Habitat Conservation Area in the northwestern portion of the project site on steep south-facing slope adjacent to Amargosa Creek parallel with the ridge to the north would be preserved as part of the No Project Alternative as this area would not be suitable for residential development. The biological resource impact of the No Project Alternative would be substantially greater than those for proposed project. Implementation of **Mitigation Measures BIO-1, BIO-2, BIO-3, BIO-4b.1 through 4b.6, BIO-5.1 and BIO-5.2** could be implemented to varying degrees for the No Project Alternative. However, unlike with the proposed project, impacts to biological resources from the No Project Alternative would remain significant and unavoidable after implementation of applicable mitigation measures.

3.3.3 Mitigation Measures and Monitoring Program

Table 3.3-4. Mitigation Monitoring Program

Mitigation Measure	*Responsible Party*	*Timing/ Frequency*
BIO-1: A Biological Resources Protection Plan shall be prepared and implemented to minimize or avoid impacts to special status wildlife species during project construction. Habitat and species protection measures shall include, at a minimum: 1. Prior to site grading, a presence/absence focused survey for sensitive species, including coast horned lizards and the burrowing owl (*Athene cunicularia*) shall be conducted on the project site by a qualified biologist under the direction of the City of Palmdale Planning Department. Individual horned lizards shall be removed from the construction area, prior to construction, and relocated to a portion of the site not scheduled for development. If the burrowing owl is determined to be present, protective measures shall be implemented to ensure compliance with the Migratory Bird Treaty Act and other relevant Fish and Game Code requirements. The protective measures may include closure of burrows used by wintering birds prior to construction and are to be developed by a qualified biologist; 2. Prior to grading, the City of Palmdale shall consult with the CDFG concerning the suitability of the habitat for the Mohave ground squirrel. If the habitat is determined to be suitable and the Mohave ground squirrel(s) are assumed to be present on the project site, mitigation for the impact to Mohave ground squirrel shall be provided with concurrence from CDFG. As outlined in the City of Palmdale General Plan, Natural Resources Element (Palmdale Planning 1993), the City of Palmdale shall cooperate with the implementation of the West Mojave Coordinated Management Plan for protection of the Mohave ground squirrel (Policy ER2.2.1 in General Plan). Mitigation may be provided as outlined in the March 29, 2006, correspondence by the City committing to mitigation for impacts to the Amargosa Creek in conjunction with the Operational Law Letter proposed for the project *in lieu* of the Streambed Alteration Agreement; 3. A qualified biologist with the appropriate permits shall be present during construction in habitats that support special status species. Any special status species, including coast horned lizards or silvery legless lizards, encountered during vegetation clearing shall be removed from the construction area, prior to construction, and relocated to a portion of the site not scheduled for development; 4. The project engineer shall clearly delineate limits of construction and, with the input of the project biologist, may designate "sensitive resource zones" on the project maps and construction plans. Sensitive resource zones are defined as areas in which construction would be limited in space, time, or methods to minimize or avoid impacts to special status species or their habitat; 5. Heavy equipment and construction activities shall be restricted to the defined limits of construction. Construction vehicles and personnel shall use existing access roads. All worker parking shall be off-site or within designated on-site areas approved by the project engineer and project biologist.	City of Palmdale	This measure shall be included in the final construction plans and specifications.

Table 3.3-4. Mitigation Monitoring Program

Mitigation Measure	*Responsible Party*	*Timing/ Frequency*
BIO-2: The Biological Resources Protection Plan identified in **BIO-1**, shall include the following measures to minimize or avoid impacts to Amargosa Creek and associated riparian and wetland habitat. 1. The project engineer shall clearly delineate limits of construction and, with the input of the project biologist, shall designate portions of the Amargosa Creek channel outside of the proposed in-channel diversion and recharge basins, as "sensitive resource zones" on the project maps and construction plans. The areas of great valley willow scrub and coastal and valley freshwater marsh habitats on site will be included in the mapping of sensitive resource zones. Sensitive resource zones are defined as areas in which construction would be limited in space, time, or methods to minimize or avoid impacts to creek channel, riparian, or wetland habitat. 2. All construction equipment shall be stored and fuelled in designated locations at least 100 feet (30.5 meters) away from Amargosa Creek and in areas approved by the project biologist. 3. The stream corridor and riparian and wetland habitat associated with culvert inflows shall be included in a project invasive species control program, specifically including eradication of existing tamarisk (an invasive non-native species) on site and maintaining the site free of tamarisk during project operations. 4. The project will obtain and comply with applicable permits, including the CDFG Stream Alteration Agreement.	City of Palmdale	This measure shall be included in the final construction plans and specifications.
BIO-3: The following shall be incorporated into the Biological Resources Protection Plan (**Mitigation Measure BIO-1**) to avoid or reduce impacts to migratory and resident breeding birds and to reduce effects on wildlife movement: 1. +Vegetation removal and preliminary grading required for project construction shall be accomplished during the season when avian species are not nesting (i.e., between September 1 and February 15). This will avoid direct impacts on nesting species by removing the habitat when they are not present. Should additional vegetation removal be required during the potential nesting season, a qualified biologist shall be retained to conduct pre-construction nesting bird surveys during the nesting season in areas that would require the direct removal of native vegetation where suitable nesting habitat for resident or migratory bird species may occur. The surveys shall focus on breeding behavior and potential nesting locations in the proposed work area and immediately adjacent to that area. Based on the results of the surveys, recommended buffer areas between construction activities and observed nesting habitat, if present, shall be provided to the resident engineer if the work were scheduled to occur near those locations while nesting is potentially occurring (February 15 through August 31) or construction in the vicinity of the nesting locations could be delayed until after the young have fledged and left the nest. 2. A qualified biologist shall be present during removal of vegetation to ensure that breeding wildlife and nesting birds are not harmed. The biologist shall have the authority through the on-site project manager to redirect or temporarily stop work if threats to the species are identified during monitoring; 3. All nighttime lighting associated with the bike path or other project facilities shall be low profile and directed away from the Amargosa Creek channel and adjacent habitats to the maximum extent feasible.	City of Palmdale	This measure shall be included in the final construction plans and specifications.

Table 3.3-4. Mitigation Monitoring Program

Mitigation Measure	*Responsible Party*	*Timing/ Frequency*
BIO-4b.1: Areas of tamarisk and cardaria infestation on-site shall be identified and mapped prior to construction. All such areas within construction areas, including the Nature Park, shall be marked on the construction plans and clearly flagged in the field.	City of Palmdale	This measure shall be shall be implemented prior to the beginning of construction.
BIO-4b.2: Prior to construction and throughout restoration, invasive non-native species, specifically including tamarisk and cardaria, shall be treated and controlled. Pre-project treatment shall encompass all areas of the project property where construction equipment will be operating, including the proposed Nature Park. Treatment shall commence sufficiently in advance of initial earthmoving to kill existing plants and infestations on-site, minimizing the chance for their spread on site as a result of earthmoving activities. Treating before construction is intended reduce the amount of viable seed or plant parts capable of resprouting that could be spread by construction thereby minimizing the potential for resprouting or spread of the species following earthmoving activities. Monitoring and treatment shall continue a minimum of three times per year, but up to five times per year until all of the performance criteria in the Nature Park Revegetation Plan have been met.	City of Palmdale	This measure shall be a condition of project approval and shall be implemented prior to the beginning of construction.
BIO-4b.3: Unless access is refused by the property owner, adjacent areas of invasive non-native plant species infestation, specifically including but not limited to tamarisk and cardaria, on lands adjacent to the proposed project site shall be treated to reduce their growth and reproduction, to minimize the potential for re-infestation of the project site.	City of Palmdale	This measure shall be a condition of project approval and shall be implemented prior to the beginning of construction.
BIO-4b.4: The proposed project Plan shall include an invasive non-native plant species control component to address invasive non-native plant species removal within the Nature Park, Recharge facilities, and on-site conservation areas. The Plan shall also establish performance criteria for distribution and density of invasive non-native plant species infestations.	City of Palmdale	This measure shall be included in the final construction plans.
BIO-4b.5: A "weed manual" shall be prepared prior to operation and maintenance activities that shall include photographs of the different invasive non-native plant species that are present on the project site or similar habitats in the project vicinity, including tamarisk and cardaria. The weed manual shall be distributed to operations personnel, including technicians managing the recharge facilities and crews performing restoration and maintenance activities. These personnel will be instructed to look for invasive non-native plant species infestations along the access roads and at structures. Invasive non-native plant species infestations identified shall be treated or removed.	City of Palmdale	This measure shall be included in the operations plan for the project and shall be implemented upon completion of construction.
BIO-4b.6: A biologist shall inspect the project site, including access roads, recharge basins and berms, at least annually for invasive non-native plant species as part of regular monitoring and maintenance activities. If invasive non-native species are found, they shall be removed using the methods provided in the proposed project Plan, or currently accepted methods. In addition, it is recommended that vehicles be washed or inspected by City of Palmdale personnel after driving through areas with identified invasive non-native plant species infestations prior to using the vehicles elsewhere to prevent the spread of those invasive non-native plant species to other areas.	City of Palmdale	This measure shall be included in the operations plan for the project and shall be implemented upon completion of construction.

Table 3.3-4. Mitigation Monitoring Program

Mitigation Measure	*Responsible Party*	*Timing/ Frequency*
BIO-5.1: Juniper and Joshua trees shall be avoided to the maximum extent feasible. The project site shall be surveyed and all Joshua trees and California junipers will be marked and enumerated as specified in the City of Palmdale Native Desert Vegetation Ordinance. Protections shall be consistent with those specified in the Ordinance and may include financial incentives and penalties, and creation of exclusion zones. Trees that may be removed and those that must be protected shall be clearly shown on project plans and marked in the field. The construction plans and specifications shall include financial compensation to the construction contractor for avoiding Joshua trees and California junipers that would be permitted to be removed and financial penalties for removing trees that are designated for protection. Financial compensation shall minimally be the estimated cost of mitigating loss of that tree (planting, monitoring, maintenance, and reporting to attain three trees that meet performance criteria for each tree removed). Financial penalties shall be minimally two times the compensation amount. Exclusion zones shall be created within the nominal construction easement to protect groups of trees where feasible.	City of Palmdale	This measure shall be included in the final construction plans.
BIO-5.2: Individual Joshua trees that cannot be avoided during construction shall be salvaged and transplanted if feasible in an on-site location specified in the plans for the Nature Park restoration. Salvage and transplantation methods, their feasibility, and likelihood of success shall be as determined by the City Arborist or a qualified independent landscape contractor. In the event that salvaging and transplanting is not feasible, one or a combination of the following two mitigation measures shall be implemented: 1) Joshua trees planted at unnaturally high densities in a portion of the site as mitigation for other projects shall be transplanted in the Nature Park area as part of the restoration; and/or 2) The Nature Park shall accept salvaged desert species from other projects (primarily Joshua trees and cacti).	City of Palmdale	This measure shall be included in the final construction plans.

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3.4 Cultural Resources

This section discusses the presence of sensitive cultural, archeological, and paleontological resources on the project site and evaluates the potential impacts these resources that would result from the development of the project. Cultural resources are districts, buildings, sites, structures, areas of traditional use, or objects with historical, architectural, cultural, or scientific importance. They include archaeological resources (both historic and prehistoric), historic architectural resources (physical properties, structures, or built items), and traditional cultural resources (those important to living Native Americans for religious, spiritual, ancestral, or traditional reasons).

3.4.1 Environmental Setting

3.4.1.1 Area of Influence

The area of influence for cultural and paleontological resources consists of the areas within the project site that could be affected by construction- or operations-related ground disturbance within natural landforms.

3.4.1.2 Setting

Cultural resource surveys have been completed in the project area for a number of previous project proposals including the 20th Street West Bridge and adjacent housing developments. At least ten recorded surveys have occurred in the immediate vicinity encompassing portions of the project site. Among the ten surveys, 100 percent of the project site has been surveyed at least once. Within the project boundaries, no artifacts have been discovered in any of the ten recorded surveys.

However, cultural resources have been found in areas near the project site, including isolated items and potential village sites. None of these sites is within the project boundaries.

The project site is underlain by Holocene alluvium and the Cretaceous Pelona Schist, both which are non-fossil-bearing. The closest vertebrate fossils are the Hamilton Formation on the northern side of the San Gabriel Mountains. This formation is not present on the site. Vertebrate fossils are considered highly important because they are comparatively rare and allow precise age determinations and environmental reconstructions for the strata in which they occur. Microfossils and invertebrate fossils are much more abundant and, for this reason and because of their small size, are not considered to be as important. However, neither type of fossil is expected to occur on the site.

3.4.1.3 Regulatory Setting

3.4.1.3.1 Federal

Archaeological and Historic Architectural Resources

The National Historic Preservation Act (NHPA) establishes national policy for protecting significant cultural resources that are defined as "historic properties" under 36 CFR 60.4. NHPA Section 106 (36 CFR §800) requires that federal agencies consider and evaluate the effect that federal projects may have on historic properties under their jurisdiction. Only historic properties are potentially subject to adverse effects under a federal action. Archaeological sites and historic structures that are not historic properties are categorically considered not significant.

The federal significance of an archaeological site or an architectural structure is defined in the NHPA implementing regulations (36 CFR §60.4). These criteria state that a resource must be at least 50 years old, and meet the following:

- The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
  - Is associated with events that have made a significant contribution to the broad patterns of history;
  - Is associated with the lives of persons significant in the past;
  - Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or
  - Has yielded, or may be likely to yield, information important in prehistory or history.

If a particular resource meets one of these criteria, it is considered as an eligible "historic property" for NRHP listing.

In addition to the NHPA, cultural resources are protected by the Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. §§ 469-469c). The ARPA describes the requirements that must be met before Federal authorities can issue a permit to excavate or remove any archeological resource on Federal or Indian lands. Requirements for curation of artifacts, other materials excavated or removed, and the records related to the artifacts and materials are described. The act provides detailed descriptions of prohibited activities including damage, defacement, and unpermitted excavation or removal of cultural resources on federal lands. Selling, purchasing, and other trafficking activities of cultural resources either within the United States or internationally is prohibited. ARPA also identifies stiff penalties that can be levied against convicted violators.

Ethnographic Resources

As prehistoric archaeological sites, artifacts, and human remains are considered important components of contemporary Native American heritage, the following two federal statutes apply:

- The American Indian Religious Freedom Act of 1978 (AIRFA) (42 U.S.C. §§ 1996-1996a) requires that locations identified as central to Native American religious practice be protected; and
- The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. §§ 3001-3013) requires that prehistoric human remains and burial-related artifacts of individuals recovered during ground disturbances be provided to those contemporary Native Americans who are recognized as descendants.

3.4.1.3.2 State

Archaeological and Historic Architectural Resources

CEQA Guidelines Section 15064.5(a.3) and PRC Section 21084.1 define the following criteria used to determine the significance of cultural resources, characterized as "historic resources."

> *Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of*

California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (PRC SS5024.1, Title 14 CCR, Section 4852).

CEQA Guidelines Section 15064.5(b) (revised October 26, 1998) states that "a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment."

1. Substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.

2. The significance of a historical resource is materially impaired when a project:

   A. Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in the CRHR;

   B. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in a historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

   C. Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

When an archaeological resource is listed in, or is eligible to be listed in, the CRHR, PRC Section 21084.1 requires that any substantial adverse effect to that resource be considered a significant environmental effect. PRC Sections 21083.2 and 21084.1 operate independently to ensure that potential effects on archaeological resources are considered as part of the environmental analysis for a project. Either of these benchmarks may indicate that a proposal may have a potential adverse effect on archaeological resources.

CEQA Guidelines Sections 15064.5 and 15126.4 guide the evaluation of impacts to prehistoric and historic archaeological resources. Section 15064.5(c) provides that, to the extent an archaeological resource is also a historical resource, the provisions regarding historical resources apply. These provisions endorse the first set of standardized mitigation measures for historic resources by providing that projects following the Secretary of the Interior's Standards for Treatment of Historic Properties be considered as mitigated to a less than significant level.

Other state-level requirements for cultural resources management are written into the California PRC, Chapter 1.7, Section 5097.5 (Archaeological, Paleontological, and Historical Sites).

Ethnographic Resources

The disposition of Native American burials is governed by Section 7050.5 of the California Health and Safety Code, and Sections 5097.94 and 5097.98 of the Public Resources Code, and falls within the jurisdiction of the

Native American Heritage Commission (NAHC). Section 7052 of the Health and Safety Code establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives.

Penal Code Section 622.5 provides misdemeanor penalties for injuring or destroying objects of historical or archaeological interest located on public or private lands, but specifically excludes the landowner. PRC Section 5097.5 defines as a misdemeanor the unauthorized disturbance or removal of archaeological or historical resources located on public lands.

Paleontological Resources

Section 5097.5 of the California PRC prohibits excavation or removal of any "vertebrate paleontological site or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands." Section 30244 requires reasonable mitigation of adverse impacts to paleontological resources from development on public land. Penal Code Section 623 spells out regulations for the protection of caves, including their natural, cultural, and paleontological contents. It specifies that no "material" (including all or any part of any paleontological item) shall be removed from any natural geologically formed cavity or cave.

3.4.2 Impacts and Mitigation Measures

3.4.2.1 Methodology

Impacts on cultural resources were evaluated by determining whether ground-disturbance activities associated with construction or operations of the proposed project would affect areas that contain or could contain archaeological or historical sites or historic structures listed in or eligible for listing in the NRHP, the CRHR, or would otherwise be considered a unique or important archaeological or paleontological resource.

3.4.2.2 Significance Criteria

CEQA Guidelines Section 15064.5 (revised October 26, 1998) indicates that a project may have a significant environmental effect if it causes "substantial adverse change" in the significance of a "historical resource" or a "unique archaeological resource," as defined or referenced in CEQA Guidelines Section 15064.5 (b, c). Such changes include "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired" (CEQA Guidelines 1998 Section 15064.5 [b]).

The following significance criteria are derived from relevant state regulations related to the identification of significant cultural resources and substantial adverse effects on those resources. Consistent with CEQA Guidelines *Appendix G* Environmental Checklist, an impact on cultural or paleontological resources would be considered significant if a project would:

CR-1: Adversely affect a resource listed in or eligible for listing in the NRHP, the CRHR, or otherwise considered a unique or important archaeological resource under CEQA.

An adverse effect on a cultural resource is defined as:

- Demolition, physically damaged, or altered;
- Relocation that would isolate the resource from its original context; or
- Conversion, rehabilitation, or alteration that does not conform to the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.

CR-2: Result in the permanent loss of, or loss of access to, a paleontological resource of regional or statewide significance.

3.4.2.3 Proposed Project

Impact CR-1: The project is unlikely, but has the potential to adversely affect a resource listed in or eligible for listing in the NRHP, the CRHR, or otherwise considered a unique or important archaeological resource under CEQA.

Archival research suggests a minimal potential for significant subsurface prehistoric or historic archaeological materials on the site. While no recorded in-context archaeological resources have been identified at the project site, a small potential exists for these resources to be uncovered during ground-disturbing activities associated with construction and operations of the proposed project. One isolate was found near and outside the eastern boundary of the site, but no other artifacts were recorded in association with it. The use of jack and bore or directional drilling techniques during the construction of the portion of the Aqueduct Diversion Pipeline from Elizabeth Lake Road to the diversion point would reduce disturbance to near-surface soils and the potential for impacting archaeological resources is considered to be very low. Trenching activities associated with the proposed Aqueduct Diversion Pipeline and the Collector Pipeline construction, as well as the ground-disturbing activities associated with construction and operation of the retention basins, would have a greater likelihood of disturbing archaeological resources. Given the fact that no archaeological resources have been identified within the proposed project area during previous archaeological investigations, the potential for impacting archaeological resources is considered to be low. However, such impacts would be significant.

No known human burials have been identified on the project site or vicinity. However, it is possible that unknown human remains could occur on the project site, and if proper care is not taken during ground-disturbing activities associated with construction and operations, damage to or destruction of these unknown remains could occur. Such impacts would be significant.

Mitigation Measures

Although the potential for impacts on unknown archaeological cultural resources is low, because archaeological resources exist in the vicinity, the following mitigation measure is recommended to ensure that unexpected, intact, potentially significant on-land archaeological resources eligible for listing in the NRHP, the CRHR, or otherwise considered a unique or important archaeological resource under CEQA are properly managed if encountered during construction.

- **Mitigation Measure CR-1.1**: **Archaeological Monitor.** A qualified archaeological/paleontological monitor shall be retained before initiation of construction and shall be present during ground-disturbing activities associated with pipeline trenching and construction of recharge basins, as these activities have the greatest likelihood of disturbing unknown archaeological resources. In the event that previously unknown, intact, cultural resources are encountered during construction activities, work shall be temporarily halted and redirected until the qualified archaeologist can evaluate the significance of the find. If significant, the cultural remains shall be mitigated consistent with the State Historic Preservation Officer Guidelines.
- **Mitigation Measure CR-1.2: Project Archaeologist.** In the event that previously unknown, intact, cultural resources are encountered during project-related operational activities operational activities, work shall be temporarily halted and redirected until a qualified archaeologist can evaluate the significance of the find. If significant, the cultural remains shall be mitigated consistent with the State Historic Preservation Officer Guidelines.

- **Mitigation Measure CR-1.3: Proper Notification of Human Remains**. In the event that human remains are discovered during ground-disturbing activities associated with construction or operation of the project elements, an appropriate representative of Native American grounds and the County Corner shall be informed and consulted as required by law.

Significance of Impacts After Mitigation

In the event that intact archaeological and/or human remains are identified during construction or operations, **Mitigation Measure CR-1.1 and CR-1.3** would ensure that the materials and remains were evaluated and mitigated according to professional standards and state law. With implementation of Mitigation Measure CR1.1 and CR-1.2, impacts to cultural resources would be less than significant.

Impact CR-2: The proposed project is unlikely, but has the potential to result in the permanent loss of, or loss of access to a paleontological resource of regional or statewide significance.

Although no known paleontological resources have been identified on the project site, it is possible that deeper underlying soils could contain undiscovered resources and could be uncovered during ground-disturbing activities associated with construction and operations of the proposed project. Without proper monitoring during the grading and ground-disturbing activities of the proposed project, unknown resources could be damaged or destroyed. As such, the proposed project activities are unlikely, but have the potential to result in the permanent loss of, or loss of access to, a significant paleontological resource. Such impacts would be significant.

Mitigation Measures

Although the potential for impacts on unknown paleontological resources is low, the following mitigation measure is provided in the unlikely event unknown, intact, significant paleontological resources are encountered during construction.

- **Mitigation Measure CR-2.1**: **Project Paleontologist.** An archaeological/paleontological monitor shall be retained before initiation of construction and shall be present during ground-disturbing activities associated with pipeline trenching and construction of recharge basins, as these activities have the greatest likelihood of disturbing unknown archaeological resources. In the event that previously unknown, paleontological resources are encountered during project-related activities, work shall be temporarily halted and redirected until the qualified paleontologist can evaluate the significance of the find. The project paleontologist shall have the authority to temporarily divert or redirect grading to allow time to evaluate exposed fossil material.

Significance of Impacts After Mitigation

In the event that intact paleontological resources are identified during construction or operation activities, **Mitigation Measure CR-2.1** would ensure that the materials and remains were evaluated and mitigated according to professional standards and state law. With implementation of Mitigation Measure CR 2.1 and, impacts to cultural resources would be less than significant.

3.4.2.4 Alternative 1 – No In-Channel Recharge Basins

The No In-Channel Recharge Basin Alternative would involve the same construction and operation of facilities as the proposed project with the exception of the in-channel recharge basins. This alternative would not alter the size of the nature park or pipeline lengths or alignments. Similar to the proposed project, ground-disturbing activities associated with the construction and operation of the No In-Channel Recharge Basin Alternative are not expected but have the potential to result in impacts to resources listed in or eligible for

listing in the NRHP, the CRHR, or otherwise considered a unique or important archaeological resource under CEQA and/or to result in the permanent loss of, or loss of access to a paleontological resource of regional or statewide significance. As such, implementation of the No In-Channel Recharge Basin Alternative has a slight potential to result in significant impacts on cultural resources. However, this alternative would eliminate the very unlikely potential for impacts to cultural resources associated with construction and operation of the in-channel basins as compared to the proposed project. As with the proposed project, Mitigation Measures CR-1.1 through 1.3 and Mitigation Measure CR-2.1 would be implemented to reduce potentially significant impacts to a less than significant level.

3.4.2.5 Alternative 2 – Reduced Off-Channel Recharge Basins

The Reduced Off-Channel Recharge Basin Alternative would eliminate three off-channel basins located on in approximately 10 acres in the eastern portion of the project site. This area would instead become part of the Nature Park. Additionally, under this alternative the Collector Pipeline would decrease in length as compared to the proposed project. This alternative would involve the same construction and operation of facilities as the proposed project with the exception of those items discussed above. Similar to the proposed project, ground-disturbing activities associated with the construction and operation of the Reduced Off-Channel Recharge Basin Alternative are not expected but have the potential to result in impacts to resources listed in or eligible for listing in the NRHP, the CRHR, or otherwise considered a unique or important archaeological resource under CEQA and/or to result in the permanent loss of, or loss of access to a paleontological resource of regional or statewide significance. As such, implementation of the Reduced Off-Channel Recharge Basin Alternative has a slight potential to result in significant impacts on cultural resources. However, this alternative would eliminate potential impacts to cultural resources associated with construction and operation of the three off-channel basins as compared to the proposed project. As with the proposed project, Mitigation Measures CR-1.1 through 1.3 and Mitigation Measure CR-2.1 would be implemented to reduce potentially significant impacts to a less than significant level.

3.4.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

The Alternative Aqueduct Diversion Pipeline Alignments Alternative would change the location and the length of the aqueduct diversion pipeline. This alternative would involve the same construction and operation of facilities as the proposed project; however construction would occur over a shorter distance because of the reduced pipeline length. Similar to the proposed project, ground-disturbing activities associated with the construction and operation of the Alternative Aqueduct Diversion Pipeline Alignments Alternative are not expected, but have the potential to result in impacts to resources listed in or eligible for listing in the NRHP, the CRHR, or otherwise considered a unique or important archaeological resource under CEQA and/or to result in the permanent loss of, or loss of access to a paleontological resource of regional or statewide significance. As such, implementation of this alternative has a slight potential to result in significant impacts on cultural resources. However, this alternative would reduce potential impacts to cultural resources associated with construction of the Aqueduct Diversion Pipeline. Particularly, the in-channel route would be be very unlikely to encounter cultural resources. As with the proposed project, Mitigation Measures CR-1.1 through 1.3 and Mitigation Measure CR-2.1 would be implemented to reduce potentially significant impacts to a less than significant level.

3.4.2.7 Alternative 4 – No Project Alternative

Given the current zoning, the No Project Alternative could involve the development of up to 280 homes on approximately 50 acres of the project site. The No Project Alternative would therefore involve a greater physical area of ground and subsurface disturbance than the Proposed project. Given this larger physical area, there would be a greater potential to encounter and disturb cultural and paleontological resources. Therefore, the No Project Alternative has a greater potential for significant cultural resource and paleontological resource

impacts than the Proposed project. Implementation of the recommended mitigation measures would likely reduce impacts to less than significant levels.

3.4.3 Mitigation Monitoring Program

Table 3.1-1. Mitigation Monitoring Program

Mitigation Measure	*Responsible Party*	*Timing/Frequency*
Mitigation Measure CR-1.1: **Archaeological Monitor.** A qualified archaeological/paleontological monitor shall be retained before initiation of construction and shall be present during ground-disturbing activities associated with pipeline trenching and construction of recharge basins, as these activities have the greatest likelihood of disturbing unknown archaeological resources. In the event that previously unknown, intact, cultural resources are encountered during construction activities, work shall be temporarily halted and redirected until the qualified archaeologist can evaluate the significance of the find. If significant, the cultural remains shall be mitigated consistent with the State Historic Preservation Officer Guidelines.	City of Palmdale	During ground-disturbing construction activities.
Mitigation Measure CR-1.2: Project Archaeologist. In the event that previously unknown, intact, cultural resources are encountered during project-related operational activities operational activities, work shall be temporarily halted and redirected until the qualified archaeologist can evaluate the significance of the find. If significant, the cultural remains shall be mitigated consistent with the State Historic Preservation Officer Guidelines.	City of Palmdale	During project-related, ground-disturbing operational activities.
Mitigation Measure CR-1.3: Proper Notification of Human Remains. In the event that human remains are discovered during ground-disturbing activities associated with construction or operation of the project elements, an appropriate representative of Native American grounds and the County Corner shall be informed and consulted as required by law.	City of Palmdale	During ground-disturbing activities associated with construction or operation of the proposed project.
Mitigation Measure CR-2.1: **Project Paleontologist.** An archaeological/paleontological monitor shall be retained before initiation of construction and shall be present during ground-disturbing activities associated with pipeline trenching and construction of recharge basins, as these activities have the greatest likelihood of disturbing unknown archaeological resources. In the event that previously unknown, paleontological resources are encountered during project-related activities, work shall be temporarily halted and redirected until the qualified paleontologist can evaluate the significance of the find. The project paleontologist shall have the authority to temporarily divert or redirect grading to allow time to evaluate exposed fossil material.	City of Palmdale	During ground-disturbing activities associated with construction or operation of the proposed project.

3.5 Geology and Soils

3.5.1 Environmental Setting

3.5.1.1 Area of Influence

Geological impacts were evaluated in two ways: (1) impacts of the proposed project on the local geologic environment; and (2) impacts of geohazards on proposed project components that may result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury. The proposed project could potentially be affected by large earthquakes, liquefaction, or landslides. The project could also impact nearby structures by increased likelihood of liquefaction and flooding. Therefore, the geologic area of influence includes the project site and hydrologically downgradient structures.

3.5.1.2 Setting

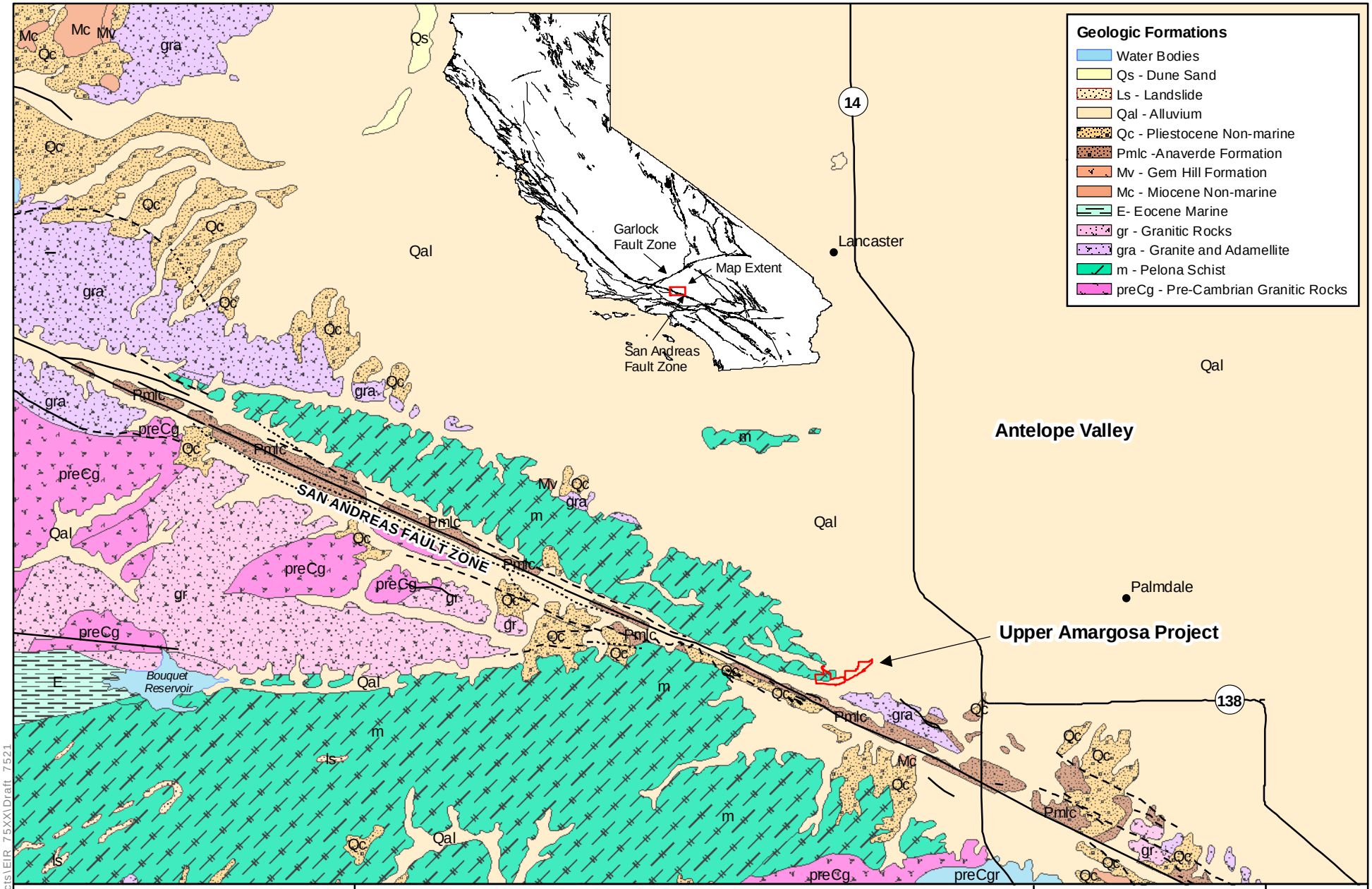
3.5.1.2.1 Topography, Drainage, and General Geology

The project site is located along the southwestern perimeter of the Antelope Valley, in northern Los Angeles County, California. The Antelope Valley is a large sediment-filled structural depression that is a down-faulted block, located between the Garlock and San Andreas faults (Figure 3.5-1). The basin is filled with unconsolidated alluvium and lacustrine (i.e., lake) deposits. The San Andres Rift Zone, located immediately south of the project site, is comprised of a series of aligned trough-like valleys, including Anaverde and Leona valleys. South of the fault zone, the Sierra Pelona Mountain Range rises to 5,217 feet above sea level. The relatively flat-lying portions of the project site are underlain by Quaternary alluvium and the sloped portions are underlain by Pelona Schist bedrock (Jennings and Strand 1969; California Geological Survey 2003b).

The UAP site is located approximately 2,780 feet above sea level, partially within the active flood plain of Amargosa Creek (Figure 3.5-2). The encompassing, northwest-southeast-trending Amargosa Creek Watershed is located within the easterly portion of Leona Valley, along the north facing side of the Pelona Mountains. The Amargosa Creek watershed is an asymmetric, palmate-shaped drainage network, incised into bedrock of the Sierra Pelona Mountains. A thin veneer of coarse grained alluvium is deposited along the drainage network. Because the watershed overlies the San Andres Fault Zone, alluvial drainages within the watershed have been offset by right lateral strike-slip tectonic movement.

3.5.1.2.2 Slope Stability

Slope failures, also commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience shallow soil slides, rapid debris flows, and deep-seated rotational slides. Landslides may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslides typically occur within slide-prone geologic units that contain excessive amounts of water, are located on steep slopes, or where planes of weakness are parallel to the slope angle. The California Geological Survey (2003a) has identified a portion of the western section of the proposed project site as an area of potential earthquake induced landslides (Figure 3.5-3). The potential for such landslides is based on previous occurrence of landslide movement or local topographic, geological, geotechnical, and subsurface water conditions that indicate a potential for permanent ground displacement. More specifically, the landslide potential in the project area is primarily a result of dip-slopes in the foliated Pelona Schist, which is metamorphic bedrock (California Geological Survey 2003b).



NOTES:

Geologic Map: Adapted from Los Angeles Quadrangle, Jennings & Strand, 1969
Coordinate System: CA State Plane Zone V (ft)
Horizontal Datum: NAD 83

Regional Geologic Map

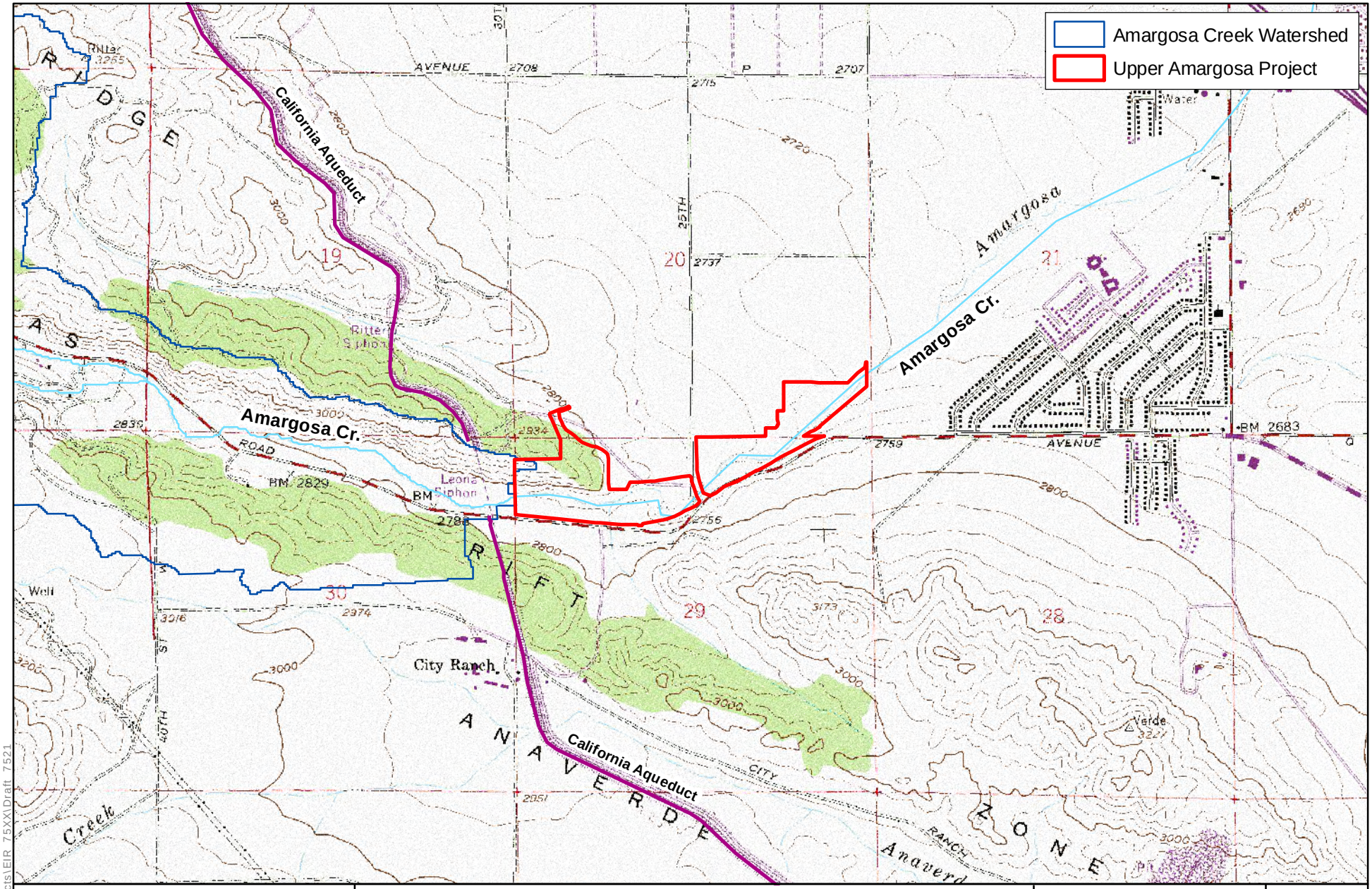
0 1 2 4 6 8
Miles

SAIC From Science to Solutions

FIGURE: 3.5-1

DATE: 12/17/08 BY: D Beckwith

File: T:\Palmdale\Projects\EIR_75XX\Draft_7521



NOTES:
Base Map: USGS Ritter Ridge Quadrangle
Coordinate System: CA State Plane Zone V (ft)
Horizontal Datum: NAD 83

Topography and Drainage

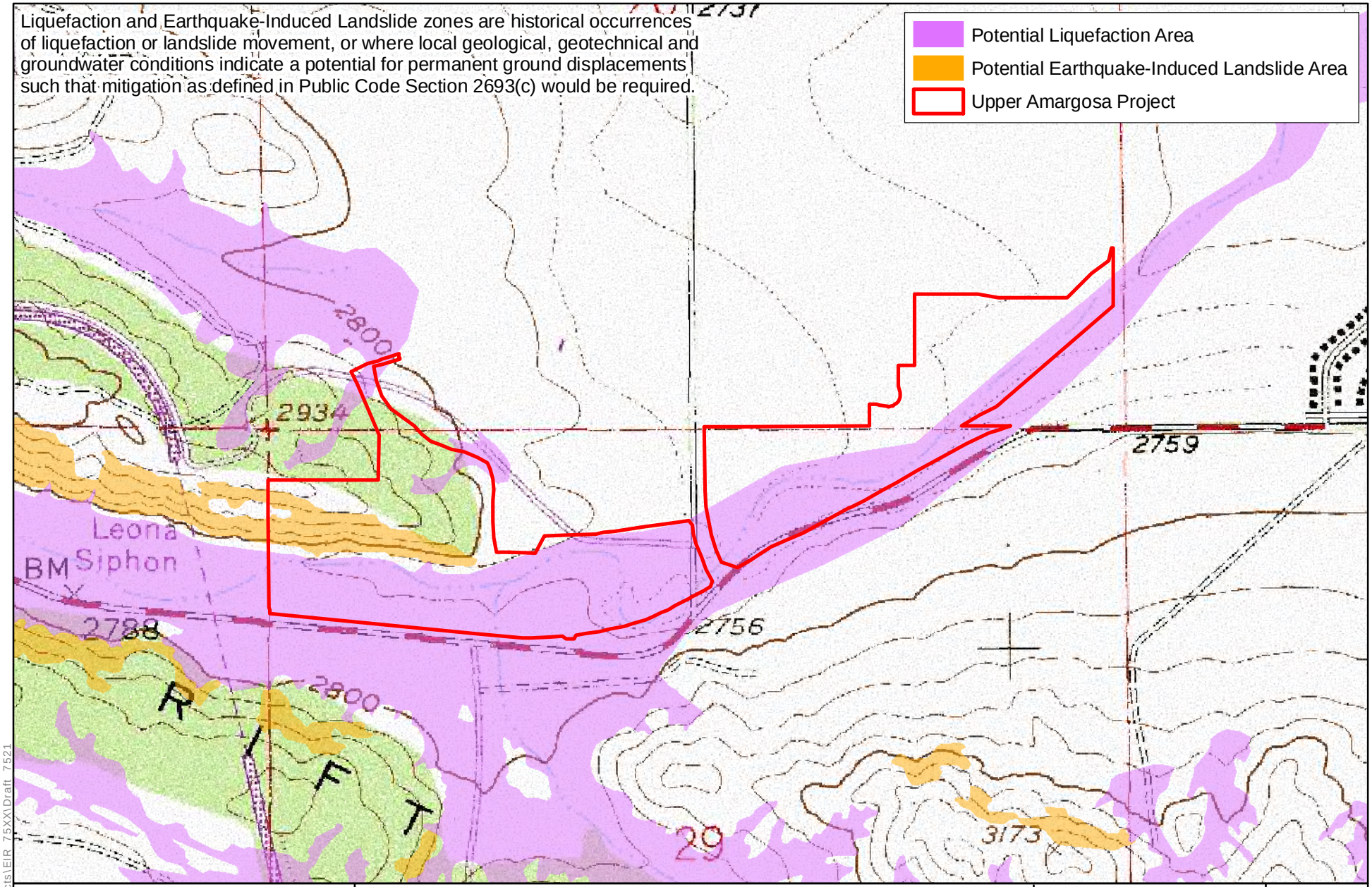
0 0.125 0.25 0.5 0.75 1
Miles

SAIC From Science to Solutions

DATE: 12/16/08
BY: D Beckwith

FIGURE:
3.5-2

File: T:\Palmdale\Projects\EIR 75XX\Draft 7521



NOTES:
Hazard Zones: California Geological Survey, Ritter Ridge Quadrangle, August 2003
Base Map: USGS Ritter Ridge Quadrangle
Coordinate System: CA State Plane Zone V (ft)
Horizontal Datum: NAD 83

N

Seismic Hazard Zones

0 0.05 0.1 0.2 0.3 0.4 0.5
Miles

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DATE: 12/16/08
BY: D Beckwith

FIGURE:
3.5-3

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3.5.1.2.3 Soils and Erosion

Soils in the Antelope Valley can be highly susceptible to water and wind erosion. According to the City of Palmdale General Plan, the proposed project is located within an area of moderate soil erosion potential. The Report and General Soil Map of Los Angeles County (U.S. Department of Agriculture, Soil Conservation Service 1969) indicates that the northwestern, sloped portion of the project site is underlain by Vista-Amargosa association soils, which generally consist of coarse-grained sandy loam and gravel, overlying hard granitic rock.; These occur on 30 to 50 percent, steep mountain slopes; are prone to rapid runoff; and have a high erosion potential. The relatively flat-lying portions of the project site are underlain by the Hanford-Greenfield soil association, which generally consist of coarse-grained sandy loam; occurs on 2 to 5 percent, gently sloping alluvial fans; are prone to slow runoff; and have a slight to moderate erosion potential.

3.5.1.2.4 Expansive Soils

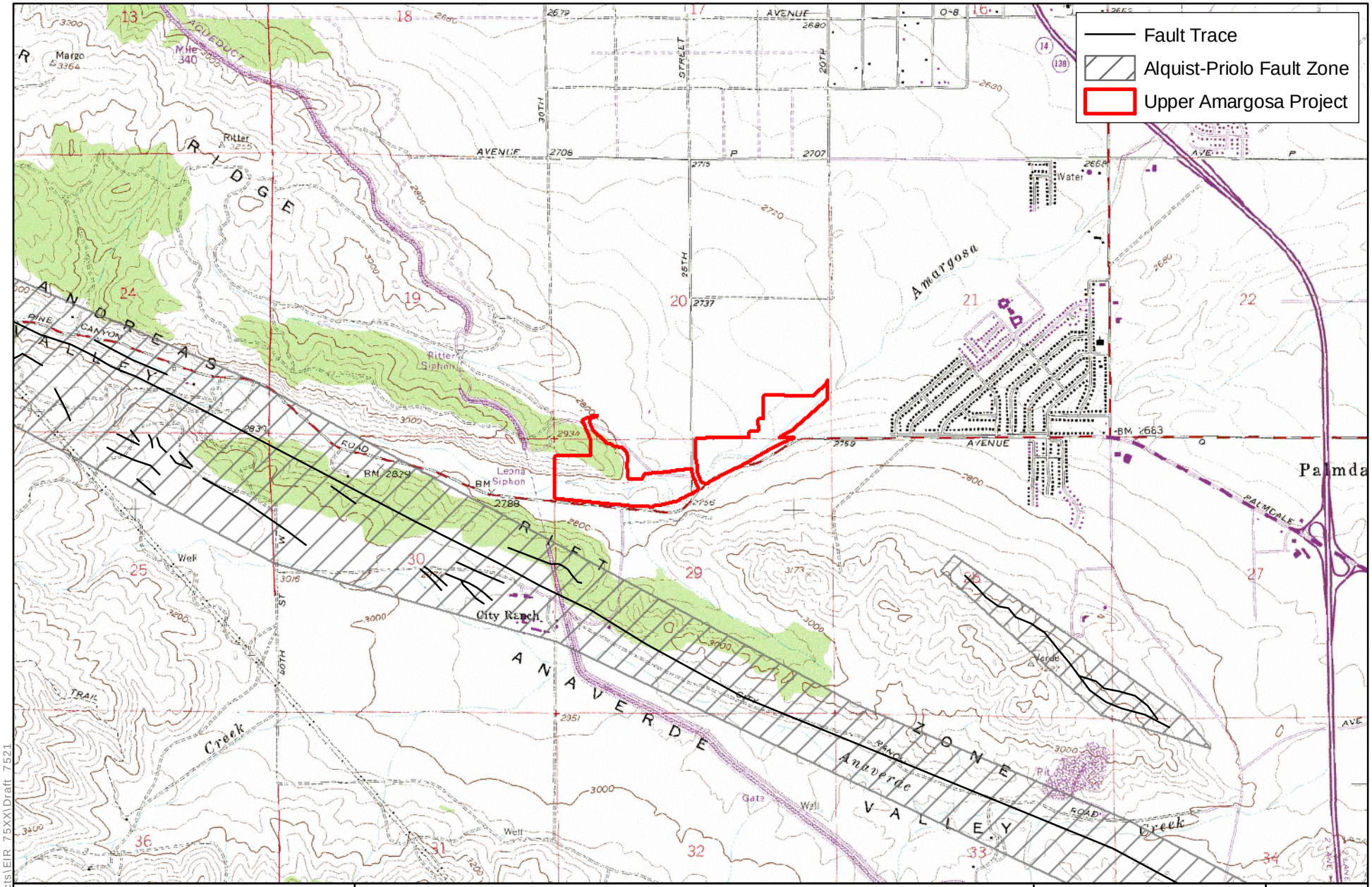
Expansive soils possess a "shrink-swell" behavior, which is the cyclic change in volume (expansion and contractions) that occurs in fine-grained clay sediments from the process of wetting and drying. Structural damage can occur over a long-period of time as a result of this shrink-swell process. According to the City of Palmdale General Plan, the soil expansion potential for the project site is low. Similarly, according to the geotechnical report prepared for the 20th Street Bridge project, by Group Delta Consultants, Inc. (2006), the project site is located within a large alluvial fan that descends in a northerly direction. Off-channel facilities of the project would be located on naturally occurring elevated terraces, composed of sand to silty sand, and the in-channel facilities would be located on sandy to gravelly stream channel deposits along the creek bottom. These types of soils generally have a low shrink swell potential.

3.5.1.2.5 Faulting and Seismicity

The UAP site is located within 1/10th of a mile northeast of the San Andreas Fault, which has been designated as an Earthquake Fault Zone, under the Alquist-Priolo Earthquake Fault Zoning Act (SCEC 2003). However, the site is not located within the fault zone (Figure 3.5-4). The Alquist-Priolo Earthquake Fault Zoning Act was created to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.

Historic events on the San Andres Fault include the Wrightwood earthquake of 1812, which had an estimate magnitude of 7.5 (Southern California Earthquake Data Center 2008). This earthquake was centered approximately 35 miles from the project site. It has been estimated that the quake resulted in as much as 106 miles of surface rupture. The 1857 Fort Tejon earthquake was also centered along the San Andreas Fault. This estimated magnitude 8.0 earthquake was centered northeast of San Luis Obispo, roughly 150 miles from the site. The surface rupture associated with this quake was approximately 220 miles in length, likely extending past the UAP site, with an average offset of 15 feet.

According to the Southern California Earthquake Center forecast, the likelihood of a magnitude 6.7 or larger earthquake in California during the next 30 years is 99.7 percent. The likelihood of an even more powerful earthquake of magnitude 7.5 or greater in the next 30 years is 45%. Such an earthquake is more likely to occur in the southern half of the state than in the northern half. There is also evidence pointing to strain buildup that will ultimately result in a large earthquake along the southern San Andreas Fault (Fialko 2006). In addition, based on the geotechnical report prepared for the 20th Street Bridge project, located at the eastern project boundary, the bridge will be designed assuming a maximum credible earthquake (MCE) of magnitude 8.0 (Group Delta Consultants, Inc. 2006). A similar size earthquake can be expected within the project area.



NOTES:
Fault Zone and Trace: California Geological Survey, 2002
Base Map: USGS Ritter Ridge Quadrangle
Coordinate System: CA State Plane Zone V (ft)
Horizontal Datum: NAD 83

Alquist-Priolo Fault Zone

0 0.125 0.25 0.5 0.75 1
Miles

SAIC From Science to Solutions

DATE: 12/16/08
BY: D Beckwith

FIGURE:
3.5-4

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3.5.1.2.6 Liquefaction

In addition to ground shaking, earthquakes may induce liquefaction, which occurs when loose sand and silt that is saturated with water behaves like a liquid when shaken by an earthquake. To induce liquefaction, earthquake waves cause water pressure to increase in the sediment and the sand grains to lose contact with each other, leading the sediment to lose strength and behave like a liquid. The soil can lose its ability to support structures, flow down even very gentle slopes, and erupt to the ground surface to form sand boils. This type of occurrence may cause structures to sink into the ground, tilt, or rupture. During such an event, sloping areas slump and even level ground may move sideways. The magnitude of liquefaction effects will depend on the interaction of soil type, soil age, soil saturation level, depth to groundwater, earthquake source, earthquake path, and specific site processes (U.S. Geological Survey 2008).

The factors which determine whether an area is susceptible to earthquake induced liquefaction can be grouped into three broad categories: (1) the intensity and duration of ground shaking; (2) the geotechnical properties of the sediments; and (3) the depth to groundwater (i.e., generally 40 feet or less is required for liquefaction to occur). According to the State of California Seismic Hazard Zones map (California Geological Survey 2003a, 2003b), the UAP site is located on an area identified to have historical occurrence of liquefaction, or local geological, geotechnical and groundwater conditions that indicate a potential for liquefaction (Figure 3.5-3).

3.5.1.2.7 Subsidence

The City of Palmdale General Plan has not classified the project area with respect to subsidence. However, based on an Initial Study completed for the 20th Street Bridge, which is located at the eastern perimeter of the proposed project site, the local soils are generally dense and of low compressibility. The near-surface soils, to depths of 15 to 20 feet, have low subsidence potential (Group Delta Consultants, Inc. 2006).

3.5.1.3 Regulatory Setting

Impacts to soils and geology are subject to a number of regulatory requirements. Erosion of soils by wind is subject to local and regional controls, primarily under the guidance of the Antelope Valley Air Quality Management District, which regulates fugitive dust emissions (see Section 3.2, Air Quality). Erosion due to water is regulated by the Lahontan Regional Water Quality Control Board (RWQCB) (see Section 3.7, Hydrology and Water Quality). Seismic hazards are addressed in local, county, and State of California building codes and regulations. The following section discusses Federal, State, and local regulations which would apply to the UAP.

3.5.1.3.1 State

California Building Code

The California Building Code corresponds to the body of regulations known as CCR, Title 24, Part 2, which is a portion of the California Building Standards Code. Title 24 is assigned to the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 to be enforceable.

The Uniform Building Code (UBC), published by the International Conference of Building Officials, is a widely adopted model building code in the United States. The California Building Code incorporates the UBC by reference, along with necessary California amendments. About one-third of the text within the California Building Code has been tailored for California earthquake conditions. Chapter 23 of the California Building Code contains specific requirements for seismic safety. Chapter 29 of the California Building Code regulates excavation, foundations, and retaining walls. Chapter 33 of the California Building Code contains specific

requirements pertaining to site demolition, excavation, and construction, to protect people and property from hazards associated with excavation cave-ins and falling debris or construction materials. Chapter 70 of the California Building Code regulates grading activities, including drainage and erosion control. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching, as specified in California Occupational Health and Safety Administration (Title 8 of the California Code of Regulations) and in Section A33 of the California Building Code.

The Alquist-Priolo Special Studies Zones Act of 1972

The criteria most commonly used to estimate fault activity in California are described in the Alquist-Priolo Special Studies Zones Act, which addresses only surface fault-rupture hazards. These legislative guidelines that determine fault activity status are based on the age of the youngest geologic unit offset by the fault. This legislation prohibits the construction of buildings used for human occupancy on active and potentially active surface faults. However, only those potentially active faults that have a relatively high potential for ground rupture are identified as fault zones. Therefore, not all active or potentially active faults are zoned under the Alquist-Priolo Earthquake Fault Zone, as designated by the State of California.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act regulations were promulgated for the purpose of protecting public safety from the effects of strong ground shaking, liquefaction, landslides, other ground failures, or other hazards caused by earthquakes. Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California (California Division of Mines and Geology 1997), constitutes the guidelines for evaluating seismic hazards other than surface fault-rupture, as well as for recommending mitigation measures as required by Public Resource Code Section 2695(a).

3.5.1.3.2 Local

Earthwork and construction in Los Angeles County must adhere to the Los Angeles County Code and the California Building Code.

Currently, construction projects resulting in the disturbance of 1.0 acre or more are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit issued by the Lahontan RWQCB. Prior to beginning construction activities, the construction contractor will be required to prepare a Storm Water Pollution Prevention Plan (SWPPP). The measures in the SWPPP must include stormwater best management practices (BMPs) acceptable to the Lahontan RWQCB and the City of Palmdale.

3.5.2 Impacts and Mitigation Measures

3.5.2.1 Methodology

3.5.2.1.1 Geologic/Seismic

Geological impacts were evaluated in two ways; (1) impacts of the project on the local geologic environment; and (2) impacts of geohazards on project components that may result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

In addition, the assessment of impacts is based on the following regulatory controls that would govern various project components and are the basis for state permits that would be required prior to construction:

- An individual NPDES permit would be prepared for stormwater discharges under the General Construction Activity Stormwater Permit, in order to contain construction- and operations-induced stormwater runoff. A SWPPP would be completed in associated with the NPDES permit.
- Project components would be designed and constructed in accordance with City of Palmdale Building and Safety Department requirements, to minimize impacts associated with seismically induced geohazards. Such construction would include, but not be limited to, completion of site-specific geotechnical investigations regarding construction and structural engineering. Measures pertaining to temporary construction conditions would be incorporated into the design. A licensed geologist or engineer would monitor construction to verify that construction occurs in concurrence with Project design.

3.5.2.2 Significance Criteria

Criteria for determining the significance of impacts related to geology and soils are based on CEQA Guidelines *Appendix G,* Environmental Checklist.

Construction Impacts

Impacts during project construction would be significant under the following circumstances:

GEO-1: Substantial alternation of the topography beyond that resulting from natural erosion and depositional processes;

GEO-2: Geologic processes such as erosion would be triggered or accelerated; or

GEO-3: The project site is located on land having substantial geologic constraints, including parcels located near active or potentially active faults and property underlain by rock types associated with compressible/expansive soils or susceptible to landslides or severe erosion.

Operational Impacts

Impacts during project operations would be significant under the following circumstances:

GEO-4: Geologic processes such as erosion or sediment deposition would be triggered or accelerated;

GEO-5: Ground rupture due to an earthquake at the site and attendant damage to structures, limiting their use due to safety considerations or physical condition;

GEO-6: Seismic-related ground motion (shaking) causing liquefaction, settlement, or surface cracks at the site and attendant damage to proposed structures, exposing the public to substantial risk of inquiry; or

GEO-7: The project site is located within a State of California Seismic Hazard Zone, which are areas that have the potential for landslide risk or contain slopes of 10 percent or greater and thus potentially expose people or structures to substantial adverse effects, including the risk of loss, injury, or death as a result of landslides.

3.5.2.3 Proposed Project

3.5.2.3.1 Construction

Impact GEO-1: Project construction would not result in substantial alternation of the topography, beyond that resulting from natural erosion and depositional processes.

The two in-channel recharge basins would be created by two earthen or sand dams, approximately three feet in height. One of the dams would be located west of the 25th Street West Bridge (Figure 2-2) and would be 300 feet in length. The second dam would be approximately 100 feet in length and would be located between the bridge abutments. The off-channel basins would include interior and exterior earthen berms, up to five feet in height, to contain and compartmentalize recharge water. The total exterior perimeter of proposed recharge basins is expected to be approximately 5,500 feet; total interior berm length is expected to be approximately 1,300 feet. General berm configuration would include a 15-foot top width, 3:1 side slopes, and a two- to three-foot freeboard.

Although the topography would be altered, construction of three- to five-foot high earthen berms is not considered substantial alteration of the topography; therefore, impacts would be less than significant.

Mitigation Measures

As impacts related to changes in topography would be less than significant, no mitigation is required

Significance of Impacts After Mitigation

Topographic impacts from grading and construction would be less than significant.

Impact GEO-2: Project construction would potentially trigger or accelerate geologic processes, such as erosion.

A certain amount of erosion is natural and is to be expected on the UAP site. Excessive erosion; however, would cause problems, such as receiving water sedimentation, ecosystem damage, and loss of soil. During construction of the UAP recharge facility, approximately 20 acres of land would be graded and converted into recharge basins, including two in-channel basins and six off-channel basins. Additional grading would be required for all multi-use pathways and park amenities on 38 acres of the project site. In addition, excavations would be completed for construction/modification of the Amargosa Turnout and excavations and trenching would be required for construction of the Amargosa Creek Diversion (i.e., dam and intake structure), the Aqueduct Diversion Pipeline, and the Recharge Basin Pipeline.

Vegetation removal and soil disturbance associated with cut-and-fill grading would result in potential erosion induced siltation of Amargosa Creek. On-site soils in areas of steep topography are highly prone to erosion, whereas, relatively flat-lying alluvial areas only have slight to moderate erosion potential. The Aqueduct Diversion Pipeline (Figure 2-2) would be constructed partially across a steep slope in the western portion of the project site. This construction easement would likely be narrower than in flatter terrain; however, stockpiled soils along this pipeline construction corridor would be especially susceptible to erosion, due to the steep topography and highly erodible soils. Similarly, excavations and trenching for the Collector Pipeline would result in temporary stockpiling of soils, which would be subject to erosion and potential siltation of the creek.

Therefore, the potential for substantial short-term soil erosion that could cause increased sediment runoff into Amargosa Creek would remain until the disturbed soils are stabilized. However, construction projects resulting in the disturbance of 1.0 acre or more are required to obtain a construction-related NPDES permit,

issued by the Lahontan RWQCB. Prior to beginning construction activities, the construction contractor would be required to prepare an SWPPP. The measures in the SWPPP must include stormwater BMPs acceptable to the Lahontan RWQCB and the City of Palmdale. Implementation of such measures would reduce potential erosion related impacts to less than significant levels.

In addition, stormwater originating along 25th Street West currently spills onto the project site through an existing culvert, near the northwestern corner of Recharge Basin 6, north of the 25th Street West Bridge (Figure 2-2). Stormwater from the culvert has created a gully up to 10 feet deep that generally extends from the culvert to Amargosa Creek, in a southeasterly direction through the proposed basin locations. A 500-foot extension to the existing culvert outlet would be constructed to realign and direct urban stormwater runoff away from project recharge facilities and into Amargosa Creek. The realigned culvert would be adjacent and parallel to the eastern side of 25th Street West and would discharge into the creek at the bridge. The discharge point would include engineered bank stabilization to control erosion in the creek. Such measures would result in a beneficial reduction of existing erosion related impacts.

Mitigation Measures

As erosion related impacts would be less than significant, no mitigation is required

Significance of Impacts After Mitigation

Erosion related impacts would be less than significant.

Impact GEO-3: The project site is located on land having substantial geologic constraints.

The western project boundary is located approximately 1/10 of a mile (530 feet) from the Alquist-Priolo designated San Andreas Fault Zone. Because the project site is not located within this zone, there is limited potential for fault rupture. However, based on the geotechnical report prepared for the 20th Street Bridge project, located at the eastern project boundary, the bridge will be designed assuming an MCE of magnitude 8.0 (Group Delta Consultants, Inc. 2006). Severe seismically induced ground shaking can similarly be expected within the project area.

In addition to ground shaking, earthquakes may induce liquefaction, which occurs when loose sand and silt that is saturated with water behaves like a liquid when shaken by an earthquake. According to the State of California Seismic Hazard Zones map (California Geological Survey 2003a, 2003b), the UAP site is located on an area identified to have historical occurrence of liquefaction, or local geological, geotechnical and groundwater conditions that indicate a potential for liquefaction (Figure 3.5-3).

Based on the geotechnical report prepared for the 20th Street Bridge project (Group Delta Consultants, Inc. 2006), the local soils are generally dense and of low compressibility. The near-surface soils, to depths of 15 to 20 feet, have low subsidence potential. In addition, based on the sandy nature of the soils in the project area, the potential for expansive soils is low.

The California Geological Survey (2003a) has identified a portion of the western section of the proposed project site as an area of potential earthquake induced landslides (Figure 3.5-3), along a relatively steep, south-facing slope. More specifically, the landslide potential in the project area is primarily a result of dip-slopes in the foliated Pelona Schist, which is metamorphic bedrock (California Geological Survey 2003b). In addition, this sloped portion of the project site is underlain by Vista-Amargosa association soils, which are prone to rapid runoff and have a high erosion potential. The Aqueduct Diversion Pipeline would be constructed down this slope and would therefore be susceptible to potential earthquake induced slope failure and severe erosion.

In summary, project construction would occur in proximity to the highly active San Andreas Fault, in an area of liquefaction potential, and in an area of localized earthquake-induced landslide and severe erosion potential. Therefore, the project site is located on land having substantial geologic constraints. However, project components, including the Aqueduct Diversion Pipeline, Collector Pipeline, and recharge basin berms would be designed and constructed in accordance with City of Palmdale Building and Safety Department requirements, to minimize impacts associated with seismic, slope stability, and erosion geohazards. Such construction would include, but not be limited to, completion of a site-specific geotechnical investigation regarding construction and structural engineering. Measures pertaining to temporary construction conditions would be incorporated into the design. A licensed geologist or engineer would monitor construction to verify that construction occurs in concurrence with Project design. Such engineering and construction controls would reduce potential geologic constraints impacts to less than significant levels.

Mitigation Measures

As geologic constraints impacts would be less than significant, no mitigation is required

Significance of Impacts After Mitigation

Geologic constraints impacts would be less than significant.

3.5.2.3.2 Operations

Impact GEO-4: Project operations would potentially trigger or accelerate geologic processes, such as erosion or sediment accumulation.

Berm and Basin Erosion

As discussed in Impact GEO-1, both in-channel and off-channel berms would be constructed as part of the project. These basins and berms would be subject to potential long-term erosion, as a result of high intensity rainfall and/or basin discharge. During periods of recharge, the interior portions of the basins would be covered by water and thus erosion would be reduced when operational. However, it is expected that each basin would be dry a portion of the year (i.e., one third of the year in the off-channel basins and in between rain events in the in-channel basins). Additionally, over the life of the project, loss of soil could occur during standard maintenance and reconstruction of berms and in-stream dams.

However, the applicant would be required to obtain an operational NPDES permit, issued by the Lahontan RWQCB, prior to operations. Similar to a construction-related NPDES permit, the applicant would prepare an SWPPP that includes stormwater BMPs acceptable to the Lahontan RWQCB and the City of Palmdale. Implementation of such measures would reduce potential erosion related impacts to less than significant levels.

Creek Scour and Sediment Deposition

Alluvial streams like Amargosa Creek are dynamic and subject to change in channel shape and flow patterns, under both natural and altered conditions. Water and sediment discharges are the principal determinates of the dimensions of a stream channel. The physical characteristics of a stream channel are significantly affected by changes in flow rate and sediment discharge, as well as by the type of sediment load, in terms of the ratio of suspended to bed load. Therefore, stream morphology is sensitive to changes in magnitudes of water and sediment discharges. The UAP will likely affect Amargosa Creek by modifying the natural flow regime, altering the flux of sediments, or both.

As discussed in Section 4.3.2.2 of Appendix C (the UAP Water Report), the Amargosa Creek channel experienced minor morphologic changes between pre-2003 and October 2008. The minimum channel elevations raised up to three feet between pre-2003 and January 2006, from the Leona Valley siphon, located near the western project boundary, to the 25th Street West Bridge (see Figure 3.5-2); lowered by one to two feet downstream of the bridge, for one thousand linear feet of channel; and changed little from 1,000 feet downstream of the bridge to 20th Street West, located at the eastern project boundary. These changes in stream morphology suggest that the 25th Street Bridge has acted as a dam behind which sediment has accumulated, with minor scour occurring downstream of the bridge.

The UAP would construct a diversion structure beside the stream channel to divert water to the off-channel basins and two in-channel earthen dams to impound storm water. Diversions/impoundment structures and operations would be designed to take a portion of the Amargosa Creek storm flow from the stream channel and either divert it to the off-channel basins or impound it in the channel for recharge. This process would decrease the velocity of the stream flow and thus decrease the bed load carrying capacity of the flow downstream of the diversion structure compared to if there were no diversion. However, the project will be operated to permit the first sediment-laden flush of storm water to flow past the diversion structure to avoid capturing excess sediment in the off-channel recharge basins and to ensure adequate flow for downstream purposes. The diversion gate would be opened only when sufficient flow had already been allowed downstream and would divert flow for the remainder of the event. Additionally, the in-channel dams would be designed to "washout" out during very high flows, thus allowing accumulated bed load to continue downgradient.

The proposed operational procedures and in-channel dam design would reduce potential impacts associated deposition and increased scouring on the downgradient side of the structure. Therefore, impacts are considered less than significant.

Mitigation Measures

As impacts related to erosion and sediment deposition would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Erosion and sediment deposition related impacts during operations would be less than significant.

Impact GEO-5: Ground rupture due to an earthquake would not likely occur at the project site.

The western project boundary is located approximately 1/10 of a mile (530 feet) from the Alquist-Priolo designated San Andreas Fault Zone. Because the project site is not located within this zone, there is limited potential for fault rupture and attendant damage to structures during operations. Therefore, impacts are considered less than significant.

Mitigation Measures

As impacts related to fault rupture would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Fault rupture related impacts during operations would be less than significant.

Impact GEO-6: During operations, seismic-related ground motion (shaking) could cause liquefaction, settlement, or surface cracks at the site and attendant damage to proposed structures, but would not likely expose the public to substantial risk of injury.

Seismically Induced Berm Failure

Even with incorporation of modern seismic engineering and associated construction, strong seismically induced ground movement, including liquefaction, differential settlement, and lateral spreading, could damage recharge basin berms. If one or all of these structures was to fail during an earthquake, large amounts of water could be released. The recharge basins cover 20 acres and are capable of holding up to 100 acre-feet (32,585,100 gallons) of water if operated at full capacity. Water depths within the recharge basins would be low (five feet or less) and if a recharge berm or in-channel dam structure were to fail during an earthquake, the result would likely be a relatively shallow sheet of water, which would be directed to Amargosa Creek via the natural topography of the site. This flow would dissipate as it traveled down Amargosa Creek; however, several structures and developments are located in proximity to the site and dissipation of the flow at these structures would be minimal. Structures of concern are the existing 25th Street Bridge and proposed 20th Street Bridge, both located within the flood plain, as well as immediately adjacent, downstream housing developments (see Figure 2-2).

Amargosa Creek, in the vicinity and immediately downstream of the UAP site, has been rated with a 50-year Capital flood capacity of 3,650 cubic feet per second (cfs). Similarly, the existing 25th Street Bridge and proposed 20th Street Bridge have been designed to be capable of withstanding a 50-year Capital flood storm event, which is the design storm for structures in the jurisdiction of the Los Angeles County Flood Control District. The Capital flood assumes flows and bulk in excess of those flows anticipated by either the 100-year storm or the 500-year storm.

In a theoretical worst case scenario, if the basins were operating at maximum capacity and all the berms failed and the total volume of stored water was released into Amargosa Creek within one minute, this would result in a flow of 72,600 cfs. This flow would be the equivalent of approximately 20 times the Capitol flood flow. In order for the flood event to be reduced to approximate the Capital flood, the total volume of the recharge basins would have to drain more slowly (i.e., in roughly 20 minutes). This scenario would result in a flow of approximately 3,630 cfs.

The recharge facilities would operate at full capacity very rarely, at most only a few times per year when storm water is present and State Water Project water is available. The likelihood of all recharge basins being at full capacity in combination with a large earthquake is very low. A more likely situation would be for one or two of the basin berms to fail during an extreme earthquake while operational. If the two largest basins catastrophically failed while operating under full capacity and all of the water drained within one minute, the result would be a flow of 22,500 cfs. In order for the flood event to be reduced to approximate the Capital flood, the total volume of the two recharge basins would have to drain in seven minutes or more. Although possible, the likelihood of the two basins catastrophically failing and completely draining in less than seven minutes is low. Any gradation of failure less than catastrophic of these two basins, such as creation of relatively small cracks that slowly leak, would result in complete basin drainage in greater than seven minutes.

In summary, even with incorporation of modern seismic engineering and associated construction, strong seismically induced ground movement could damage recharge basin berms, resulting in flooding of downstream structures, including immediately adjacent residential developments. However, the likelihood of all recharge basins at capacity in combination with a large earthquake is very low. In addition, although possible, the likelihood of two of the largest basins catastrophically failing and completely draining in less

than seven minutes is very low. Therefore, potential flooding impacts associated with seismically induced berm failure is considered less than significant.

Seismically Induced Pipeline Failure

The UAP would contain approximately 2,900 feet of conveyance pipeline (the Aqueduct Diversion Pipeline), lain from a tie-in at the State Aqueduct to the UAP diversion structure. This pipeline, which would contain more water and be under greater hydraulic head than the Collector Pipeline, would deliver water under roughly 200 feet of hydraulic head. A large earthquake could disrupt this pipeline and release this water into Amargosa Creek. However, the maximum amount of water contained in this pipeline would be approximately 5,120 cubic feet, at any given time. If all of the water were to drain in one minute, this would result in a flow of approximately 85 cfs, which is well within the flood capacity of Amargosa Creek. Therefore, impacts would be less than significant.

Liquefaction

Portions of the UAP project are within a potential liquefaction area (Figure 3.5-3). The factors which determine whether an area is susceptible to earthquake induced liquefaction can be grouped into three broad categories: (1) the intensity and duration of ground shaking; (2) the geotechnical properties of the sediments; and (3) the depth to groundwater (i.e., generally 40 feet or less). According to the State of California Seismic Hazard Zones map (California Geological Survey 2003a, 2003b), the UAP site is located on an area identified to have historical occurrence of liquefaction, or local geological, geotechnical and groundwater conditions that indicate a potential for liquefaction (Figure 3.5-3).

The UAP could increase the likelihood of liquefaction in two ways. The first would be from the immediate wetting of the soils due to recharge operations and the second would be from groundwater mounding, resulting in depth to groundwater of less than 40 feet in areas of no existing liquefaction potential. The 25th Street Bridge, proposed 20th Street Bridge, and nearby residential developments (see Figure 2-2) could be impacted by the increased likelihood of liquefaction, due to their proximity to the proposed UAP site. The 25th Street Bridge traverses the middle of the proposed UAP site and the proposed 20th Street Bridge would traverse the eastern boundary of the project site.

During operations, the UAP project would increase the length of time in which the soils are wetted and thus increase the probability of liquefaction. When flow is present in Amargosa Creek, the project would divert a portion of this flow to the off-channel basins, as well as impound a portion in the water in the in-channel basins, including impounded water abutting the 25th Street Bridge. Flow events in Amargosa Creek typically only last for a few days. Based on preliminary percolation tests, which demonstrated an infiltration rate of 3 to 11 feet per day, water retained in the in-channel basins would likely infiltrate within a few days of cessation of flow, after which the basins would become dry again. Therefore, the increase in number of days in which the subsurface is wetted in the in-channel basins, over existing conditions, would be approximately 2 to 3 days per flow event, due to storm flow capture (see Appendix D, Water Resources Evaluation of Amargosa Creek, for more details).

When State Water Project (SWP) water is available from local municipalities for recharge, it would also be diverted to the off-channel recharge basins. Based on preliminary percolation tests, the off-channel recharge basins would have the capacity to recharge 30 to 160 acre-feet per day (AFD). Based on Antelope Valley-East Kern Water Agency (AVEK) water deliveries for the year 2000, is estimated that more than 100 AFD of SWP could be available for diversion seven months per year.

An additional concern due to facility operations would be mounding of groundwater and thus increased liquefaction potential, by the presence of groundwater within 40 feet of the surface. Water delivered to the

UAP recharge facility will be spread over 20 acres of recharge basins and percolate to the underlying groundwater aquifer. Recharge operations will create a mound of water below the basins that will dissipate and move hydrologically downgradient from the basins. Excessive groundwater mounding under the recharge basins could result in groundwater levels beneath the facility to approach the ground surface. Localities that are most susceptible to liquefaction-induced damages are underlain by loose, granular, water saturated sediment within 40 feet of the ground surface (CGS 2003).

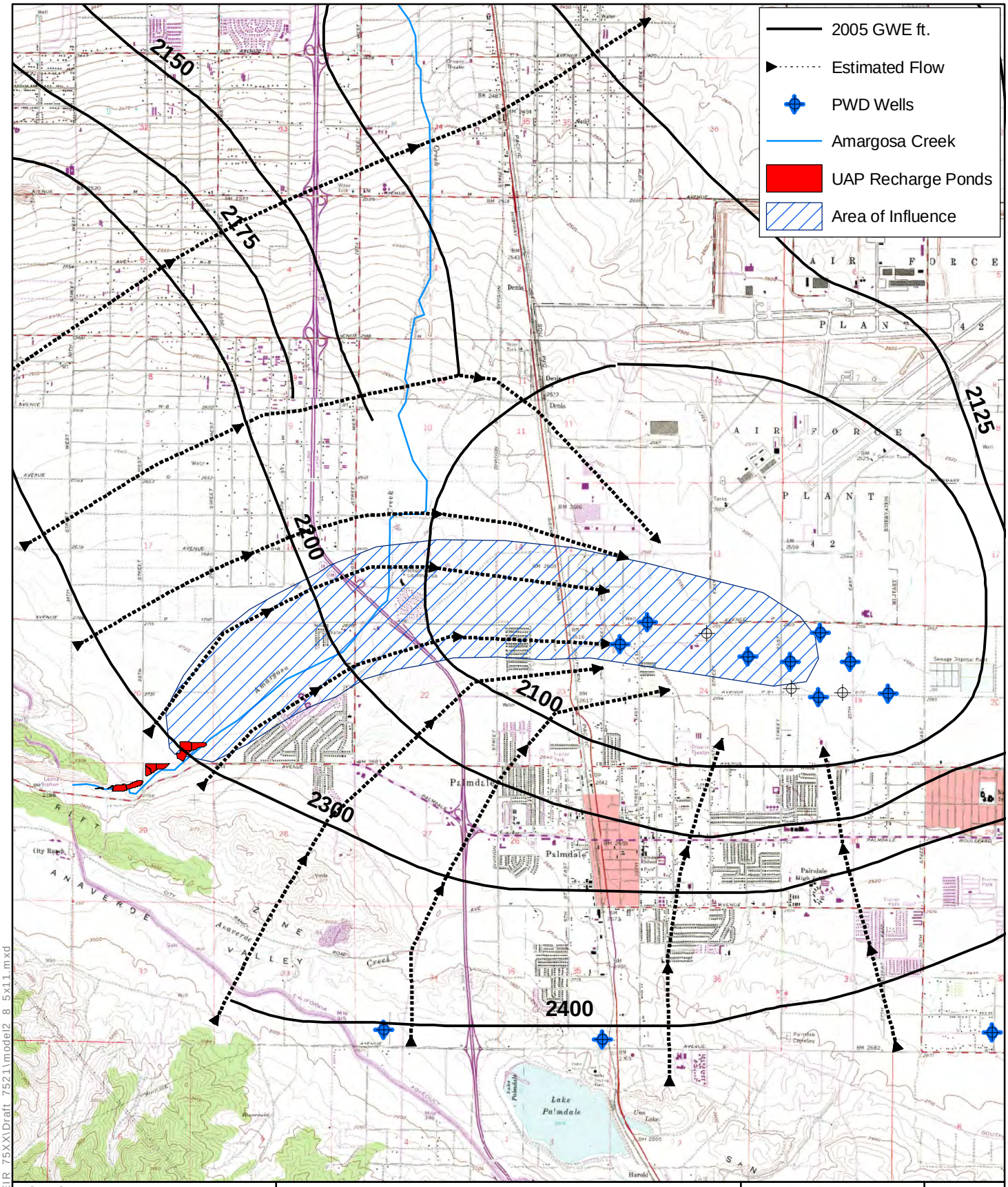
The subsurface area in which the UAP operations will likely raise water levels is considered the "area of influence". To estimate the area of influence, groundwater elevation contours from the year 2005, presented in the 2008 Problem Statement for the Antelope Valley Area Adjudication (2008 Problem Statement), were used to estimate groundwater flow nets (see Appendix D, Water Resources Evaluation of Amargosa Creek). Based on the derived groundwater flow nets, the area of influence was estimated for the UAP recharge operations, following likely groundwater flow paths (Figure 3.5-5). This area was estimated by assuming groundwater would disperse laterally from the recharge operations and flow down hydraulic gradients, initially flowing northeast along Amargosa Creek, but then diverging eastward toward several groundwater extraction wells. The area of influence has been calculated to be 2,300 acres and lateral groundwater spreading would be limited to approximately one mile. However, if a groundwater mound was to form under the UAP, water levels would drop rapidly with distance from the recharge basins.

Based on water contours presented in the 2008 Problem Statement (see Appendix D, Water Resources Evaluation of Amargosa Creek), the depth to groundwater near the UAP has been estimated to be approximately 350 feet below ground surface (bgs). Assuming this depth to groundwater, which is based on extraction wells in the Palmdale area, UAP operations could raise the water table a maximum of 310 feet without concern of liquefaction. To estimate the total rise in groundwater elevations associated with the UAP operations, two conceptual approaches have been used, including an Area of Influence Model and a Groundwater Flux Model. Detailed explanation of these approaches can be found in (see Appendix D, Water Resources Evaluation of Amargosa Creek).

The height of groundwater increase would be determined by two primary factors: (1) the rate at which water will percolate from the recharge basins to the groundwater table; and (2) the rate at which groundwater will migrate downgradient. These two factors are mostly controlled by the size and connectivity of interstitial pore space available for water to travel through and the hydraulic gradient over which the water will travel. The interstitial pore space at the UAP site is not currently well documented. To account for a lack of data regarding this aspect of soil properties, the models have been run assuming a reasonable variation of parameters.

The Area of Influence Model concluded that the maximum amount of recharge, in acre-feet per year (AFY), at the UAP facility without significantly increasing the likelihood of liquefaction is estimated to range from 13,800 AFY to 55,200 AFY. The Groundwater Flux model concluded that annual recharge volumes as high as 80,000 AFY may be possible without the threat of groundwater mounding increasing the liquefaction potential.

These methodologies provide a very simplified estimate of groundwater mounding beneath the UAP. The formation and dispersion of a groundwater mound is more complex than the models presented. However, these models allow an understanding of relative magnitudes of recharge possible at the UAP. With respect to the Groundwater Flux Model, parameters which play a major role in the modeling of mound height are the hydraulic gradient and hydraulic conductivity. For the model used here, the gradient ranged between 0.03 ft/day to 0.15 ft/day. This is the range of gradients determined from historical gradients presented in the 2005 Problem Statement, over several miles. If a groundwater mound was to form under the UAP, the gradient within a few hundred feet of the site will be much greater than these presented and will result in a faster dispersion of the peak of the mound than has been assumed in the model presented.



NOTES:

Coordinate System: UTM Zone 11N
Horizontal Datum: NAD 83

Topo Map - USGS 24k Quads

Groundwater Contours from 2008 Problem Statement for the Antelope Valley Area of Adjudication

Upper Amargosa Project Area of Influence

0 0.25 0.5 1 1.5 2

Miles

SAIC From Science to Solutions

FIGURE: 3.5-5

DATE: 02/10/2009 BY: C. Woods

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Additionally, the hydraulic conductivity is a sensitive parameter. At this point, the hydraulic conductivity of the soils is unknown and has been estimated based on research conducted several miles downgradient. Preliminary percolation tests performed on the site have resulted in short term recharge rates of two to eleven feet/day. It is common for groundwater to move faster in a horizontal direction than vertically by one to two orders of magnitude.

Other factors not considered in this model are the affects of mounding associated with natural recharge from Amargosa Creek, as well as the presence of perched groundwater aquifers, which typically are not measured in deep groundwater extraction wells, such as those used for these models. Due to the uncertainties noted, the extent of increase in shallow groundwater and associated increase in liquefaction potential, as a result of project operations, is not well defined. Therefore, impacts associated with liquefaction are considered significant but mitigable.

Mitigation Measures

MM GEO-6: Groundwater monitoring wells shall be installed at the project site to determine whether groundwater levels rise within 40 feet of the ground surface, as a result of recharge operations, to detect the potential for liquefaction. The wells shall be installed to a minimum depth of 50 feet at the down gradient perimeter of the project site and eastward of the Amargosa Creek Diversion. In the event that groundwater levels are measured within 40 feet of the ground surface, recharge quantities shall be reduced until groundwater levels fall below 40 feet.

Significance of Impacts After Mitigation

With implementation of **MM GEO-6**, monitoring of shallow groundwater in the vicinity of the site, impacts related to liquefaction would be less than significant.

Impact GEO-7: A portion of the project site is located within a State of California Seismic Hazard Zone, which are areas that have the potential for landslide risk or contain slopes of 10 percent or greater and thus potentially expose people or structures to substantial adverse effects, including the risk of loss, injury, or death as a result of landslides.

The California Geological Survey (2003a) has identified a portion of the western section of the proposed project site as an area of potential earthquake induced landslides (Figure 3.5-3), along a relatively steep, south-facing slope. More specifically, the landslide potential in the project area is primarily a result of dip-slopes in the foliated Pelona Schist, which is metamorphic bedrock (California Geological Survey 2003b). In addition, this sloped portion of the project site is underlain by Vista-Amargosa association soils, which are prone to rapid runoff and have a high erosion potential.

A portion of the Aqueduct Diversion Pipeline would be constructed down this slope and would therefore be susceptible to potential earthquake induced slope failure and severe erosion during operations. However, the Aqueduct Diversion Pipeline would be designed and constructed in accordance with City of Palmdale Building and Safety Department requirements, to minimize impacts associated with seismic, slope stability, and erosion geohazards. Such construction would include, but not be limited to, completion of a site-specific geotechnical investigation regarding construction and structural engineering. A licensed geologist or engineer would monitor construction to verify that construction occurs in concurrence with Project design. Such engineering and construction controls would slope stability impacts to less than significant levels during project operations.

Mitigation Measures

As slope stability impacts would be less than significant, no mitigation is required

Significance of Impacts After Mitigation

Slope stability impacts would be less than significant.

3.5.2.4 Alternative 1 – No In-Stream Recharge Basins

Alternative 1 would eliminate the in-channel recharge basins. Under this alternative, impacts on geology and soils would be similar in nature to, but less than those described under **Impacts GEO-1 through GEO-7** for the project. Without the construction of the in-channel basins, the topography would be altered less, the extent of construction activity causing short-term impacts (i.e., erosion) would be reduced, less infrastructure would be susceptible to geologic constraints, the creek morphology would be altered less, and there would be no earthen dams susceptible to seismically induced ground failure and associated flooding. In addition, reduced groundwater recharge would reduce the potential for project-induced shallow groundwater and associated increased liquefaction potential, in areas currently not susceptible to liquefaction. As with the project, implementation of Alternative 1 would result in less than significant impacts under CEQA, for **Impacts GEO-1, GEO-2, GEO-3, GEO-4, GEO-5,** and **GEO-7,** and significant but mitigable impacts for **Impact GEO-6.**

3.5.2.5 Alternative 2 – Reduced Area of Off-Channel Recharge Basins

Alternative 2 would reduce the number of off-channel recharge basins, from six to three. Under this alternative, impacts on geology and soils would be similar in nature to, but less than those described under **Impacts GEO-1 through GEO-7** for the project. Without the construction of the three off-channel basins, the topography would be altered less, the extent of construction activity causing short-term impacts (i.e., erosion) would be reduced, less infrastructure would be susceptible to geologic constraints, and there would be less earthen dams susceptible to seismically induced ground failure and associated flooding. In addition, reduced groundwater recharge would reduce the potential for project-induced shallow groundwater and associated increased liquefaction potential, in areas currently not susceptible to liquefaction. However, alteration of the creek morphology would be similar to the project. As with the project, implementation of Alternative 1 would result in less than significant impacts under CEQA, for **Impacts GEO-1, GEO-2, GEO-3, GEO-4, GEO-5,** and **GEO-7,** and significant but mitigable impacts for **Impact GEO-6.**

3.5.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alternatives

3.5.2.6.1 Alignment A – North Side of Amargosa Creek

Under Alternative 3, Alignment A, the east-west trending portion of the Aqueduct Diversion Pipeline would be buried into the hillside along the north side of Amargosa Creek, rather than along Elizabeth Lake Road, located on the south side of the creek. Under this alternative, impacts on geology and soils would be similar in nature to, but greater than those described under **Impacts GEO-1 through GEO-7** for the project. Pipeline construction would require excavation into the toe of a landslide-prone hillside, thus potentially undercutting naturally unstable metamorphic bedrock and inducing slope instability during construction. Therefore, geologic constraints impacts would be greater than under the proposed project. Otherwise, changes in creek morphology, potential seismically induced ground failure and associated flooding, and the potential for project-induced shallow groundwater and associated increased liquefaction would generally be the same as the project. As with the project, implementation of Alternative 3, Alignment A would result in less than

significant impacts under CEQA, for **Impacts GEO-1, GEO-2, GEO-3, GEO-4, GEO-5,** and **GEO-7,** and significant but mitigable impacts for **Impact GEO-6.**

3.5.2.6.2 Alignment B – Buried in Amargosa Creek Stream Channel

Under Alternative 3, Alignment B, the east-west trending portion of the Aqueduct Diversion Pipeline would be buried into the Amargosa Creek stream channel, rather than along Elizabeth Lake Road, located on the south side of the creek. Under this alternative, impacts on geology and soils would be similar in nature to, but greater than those described under **Impacts GEO-1 through GEO-7** for the project. Pipeline construction within the stream channel would increase the potential for erosion induced siltation of the creek, as it would be more difficult to prevent runoff of sediments into the creek. In addition, the stream morphology would be temporarily altered during construction. Therefore, geologic impacts would be greater than under the proposed project. Otherwise, potential seismically induced ground failure and associated flooding, potential for project-induced shallow groundwater and associated increased liquefaction, and potential slope instability would generally be the same as the project. As with the project, implementation of Alternative 3, Alignment B, would result in less than significant impacts under CEQA, for **Impacts GEO-1, GEO-2, GEO-3, GEO-4, GEO-5,** and **GEO-7,** and significant but mitigable impacts for **Impact GEO-6.**

3.5.2.7 Alternative 4 – No Project Alternative

The No Project Alternative could involve the development of up to 280 residential units and the disturbance of approximately 50 acres, including grading for housing pads, foundations, utilities, streets, and the like. Housing would alter the landscape substantially and would result in residential housing in closer proximity to the creek and the San Andreas Fault. During construction, there would be the potential for substantial alteration of the topography (**GEO-1**), geologic processes such as erosion could be triggered by construction (**GEO-2**), and housing would be located on land having substantial geologic constraints, including being located near active faults (**GEO-3**). With regard to operations, impacts of the No Project Alternative would be similar to those for the Proposed project but with the potential for larger numbers of persons to be exposed to potential impacts (**GEO-4, GEO-5,** and **GEO-7**). **Impact GEO-**6, which involves the potential for liquefaction, would not apply to the No Project Alternative since no groundwater recharged would occur and no potential for raising the level of groundwater would result from development of housing. Overall, given the larger numbers of people that could be exposed to geologic hazards, the impacts of the No Project Alternative would be greater than for the proposed project, though they would be less than significant with implementation of appropriate design and construction according the building codes and relevant laws and regulations.

3.5.3 Mitigation Monitoring Program

Table 3.5-1. Mitigation Monitoring Program

Mitigation Measure	*Responsible Party*	*Timing/Frequency*
MM GEO-6: Groundwater monitoring wells shall be installed at the project site to determine whether groundwater levels rise within 40 feet of the ground surface, as a result of recharge operations, to detect the potential for liquefaction. The wells shall be installed to a minimum depth of 50 feet at the down gradient perimeter of the project site and eastward of the Amargosa Creek Diversion. In the event that groundwater levels are measured within 40 feet of the ground surface, recharge quantities shall be reduced until groundwater levels fall below 40 feet.	City of Palmdale	Wells to be installed prior to the commencement of operations. Monitoring to occur routinely during recharge operations (initially on a monthly basis) to be adjusted based on actual observations.

3.6 Hazards and Hazardous Materials

The term hazardous materials is defined in different ways for different regulatory programs. This EIR uses the definition in California Health and Safety Code Section 25501(o) that defines hazardous materials as:

> *Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous wastes, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.*

This section discusses uses at the proposed project site that may have resulted in past, existing, or threatened release of hazardous substances or petroleum products into soil or groundwater beneath the property. This section also evaluates the potential impacts related to hazards and hazardous materials resulting from the proposed project. Based on the location and evident past history of the location (no agricultural or industrial uses), no Phase I Environmental Site Assessments (ESAs) have been conducted as part of this analysis.

3.6.1 Environmental Setting

3.6.1.1 Area of Influence

The area of influence for hazards associated with releases of hazardous materials (e.g., spills and leaks) would include the project site, the adjacent Amargosa Creek, and the immediately surrounding properties. Section 3.5, Geology and Soils, and Section 3.7 Hydrology and Water Quality, include a description of the area of influence for those related sources.

3.6.1.2 Setting

3.6.1.2.1 Hazardous Materials Sites

The project site is located in an area of undeveloped land surrounded by single-family resident units. No Phase I Environmental Site Assessments (ESAs) have been conducted as part of this analysis. However, the project site is not known to have had past uses involving hazardous materials nor is it located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 6592.5 (the Cortese List). Although unlikely, previously unknown contamination could be present within the project site due to unexpected and unknown prior activities such as illegal dumping or agricultural uses.

One property in the immediate vicinity of the proposed project is included in the Cortese List as a DTSC School Investigation Site (DTSC 2008). The 0.35 acre site is located at 39055 25th Street West. This site is part of the existing school. Prior to the building of the school, the property was dry-farmed between 1952 and 1968. Subsequently, the site was left vacant until 1990 when it was graded and Highland High School was constructed (DTSC 2008). DTSC's School Property Evaluation and Cleanup Division is responsible for assessing, investigating and cleaning up proposed school sites. The Division ensures that selected properties are free of contamination or, if the properties were previously contaminated, that they have been cleaned up to a level that protects the students and staff who will occupy the new school. All proposed school sites that will receive State funding for acquisition or construction are required to go through a rigorous environmental review and cleanup process under DTSC's oversight. No contaminants were found at the site and the DTSC made a "No Action" determination for the site in January 2002 (DTSC 2008).

3.6.1.2.2 Transport of Hazardous Materials

Transport of hazardous materials through the City of Palmdale is regulated by the California Department of Transportation (DOT). The Antelope Valley Freeway and Highway 138 are State routes and are open to vehicles carrying hazardous materials. City streets and unincorporated Los Angeles County areas are generally not designated as hazardous materials transportation routes, but permits may be granted on a case-by-case basis. Transporters of hazardous waste are required t be certified by the DOT and manifests are required to track hazardous waste during transport.

3.6.1.3 Regulatory Setting

Regulations applicable to the proposed project are designed to regulate hazardous materials and hazardous wastes. These regulations also are designed to limit the risk of upset during the use, transport, handling, storage, and disposal of hazardous materials. The Project would be subject to numerous federal, state, and local laws and regulations including, but not limited to, those described below.

3.6.1.3.1 Federal

Resource Conservation and Recovery Act (RCRA) of 1976 (42 U.S.C. Section 6901-6987)

The goal of RCRA, a federal statute passed in 1976, is the protection of human health and the environment, the reduction of waste, the conservation of energy and natural resources, and the elimination of the generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments (HSWA) of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements. The corresponding regulations in 40 CFR 260-299 provide the general framework for managing hazardous waste, including requirements for entities that generate, store, transport, treat, and dispose of hazardous waste.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA, commonly known as Superfund, provides broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste at these sites, provided for liability of persons responsible for releases of hazardous waste at these sites, and established a trust fund to provide for cleanup when no responsible party could be identified.

Emergency Planning and Community Right-To-Know Act (42 U.S.C. 11001 et seq.)

Also known as Title III of the Superfund Amendments and Reauthorization Act (SARA), the Emergency Planning and Community Right-To-Know Act (EPCRA) was enacted by Congress as the national legislation on community safety. This law was designated to help local communities protect public health, safety, and the environment from chemical hazards. To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC). The SERCs were required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee (LEPC) for each district. EPCRA provides requirements for emergency release notification, chemical inventory reporting, and toxic release inventories for facilities that handle chemicals.

3.6.1.3.2 State

Hazardous Waste Control Law (California Health and Safety Code, Chapter 6.5)

This statute is the basic hazardous waste law for California. The Hazardous Waste Control Law implements the federal RCRA cradle-to-grave waste management system in California. California hazardous waste regulations can be found in Title 22, Division 4.5, Environmental Health Standards for the Management of Hazardous Wastes. The program is administered by the California Department of Toxic Substance Control (DTSC) and local Certified Unified Program Agencies (CUPAs). Authority from the state was delegated to local CUPAs to establish a unified hazardous waste and hazardous materials management program for hazardous waste generators, treatment of hazardous waste subject to tiered permitting, facilities with USTs and ASTs, risk management and prevention plans, and hazardous materials management plans and inventory statements required by the Uniform Fire Code.

As part of the local CUPA, the Los Angeles County Fire Department (LACFD) regulates storage and disposal of hazardous materials through enforcement and education programs for the proposed project.

Hazardous Material Release Response Plans and Inventory Law (California Health and Safety Code, Chapter 6.95)

This state right-to-know law requires businesses to develop a Hazardous Material Management Plan or a "business plan" for hazardous materials emergencies if they handle more than 500 pounds, 55 gallons, or 200 cubic feet of hazardous materials. In addition, the business plan includes an inventory of all hazardous materials stored or handled at the facility above these thresholds. This law is designed to reduce the occurrence and severity of hazardous materials releases. The Hazardous Materials Management Plan or business plan must be submitted to the Certified Unified Program Agency (CUPA). The state has integrated the federal EPCRA reporting requirements into this law.

3.6.1.3.3 Local

City of Palmdale General Plan – Safety Element

The City of Palmdale General Plan, Safety Element, contains goals and objectives relevant to risks posed by natural and man-made hazards that guide private development, government actions, and programs within the City. Additionally, the Safety Element contains policies to improve and minimize hazards to public health and safety. These goals, objectives, and policies are intended to serve as long-term principles and policy statements.

3.6.2 Impacts and Mitigation Measures

3.6.2.1 Methodology

Hazards and hazardous materials impacts have been evaluated primarily with respect to the potential for spills during construction and operations. The assessment of impacts is based on the assumption that coverage under an individual NPDES/WDR permit for project operations and a NPDES Construction Activity Storm Water General Permit for construction activities. A Storm Water Pollution Prevention Plan (SWPPP) would be completed in association with each of these permits.

3.6.2.2 Significance Criteria

Consistent with CEQA Guidelines *Appendix G* Environmental Checklist Form, the proposed project would have a significant impact on hazards and hazardous materials if it would result in one or more of the following conditions:

HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or reasonably foreseeable upset and accident involving the release of hazardous material into the environment;

HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions associated with operations and/or maintenance; or

HAZ-3: Create a significant hazard to the public or environment through the presence of soil or groundwater contamination.

3.6.2.3 Proposed Project

Impact HAZ-1: Construction of the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or reasonably foreseeable upset and accident involving the release of hazardous material into the environment.

Construction of the proposed project would involve site preparation, basin and pipeline construction, park construction, and revegetation. Construction activities associated with the proposed project would require the use and transport of hazardous materials, including fuels, lubricants, and other chemicals used during construction. Construction of the proposed project would involve the use of heavy equipment that would contain oil, gasoline, or other fluids. It is likely that these hazardous materials and vehicles would be stored by contractor(s) on-site during construction activities. These products contain hazardous compounds. An accidental release of these materials during normal usage or during refueling would be short term and localized, but could injure construction workers, contaminate soil, and/or affect nearby surface water bodies or ground water. However, transport, storage, use, and disposal of hazardous materials during construction activities would be performed in accordance with existing local, state, and federal hazardous material regulations, including the federal RCRA and CERCLA, and CCR Title 22 and Title 26. The project would comply with these laws and regulations, ensuring that materials handling would occur in an acceptable manner. Additionally, coverage would be established under the NPDES Construction Activity Storm Water General Permit. A SWPPP would be prepared in association with this NPDES permit. NPDES permit-mandated BMPs would govern spill containment during construction activities. Applicable Best Management Practices (BMPs) include, but are not limited to, temporary spill containment equipment for vehicle and equipment fueling and maintenance and solid and hazardous waste management. Section 3.7, Hydrology and Water Quality, provides a detailed discussion of water quality impacts associated with releases of hazardous materials due to construction of the proposed project.

In summary, hazardous substances and petroleum products would potentially be spilled or exposed during project construction, resulting in health and safety impacts to on-site personnel and/or the environment. However, implementation of standard BMPs, proper transportation, use, storage, and disposal of hazardous materials and petroleum products, in accordance with applicable federal, state, and local regulations would result in less than significant impacts related to hazards and hazardous materials.

Mitigation Measures

As impacts on hazards and hazardous materials would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on hazards and hazardous materials would be less than significant.

Impact HAZ-2: Operation of the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or reasonably foreseeable upset and accident involving the release of hazardous material into the environment.

The proposed project would have little potential for the transportation, use, or disposal of hazardous materials. Typical materials associated with normal maintenance of the proposed project could include pesticides and herbicides for landscape maintenance associated with the Nature Park and minor amounts of lubricants and oils for valve maintenance associated with the retention basins and pipeline infrastructure. These materials are not expected to be stored on-site. Recharge basin repair and reconditioning would be required periodically. These activities would require the transport, use, and temporary storage of heavy equipment that would contain oil, gasoline, or other fluids. Impacts associated with these activities would be similar to those discussed under Impact HAZ-1.1 for project-related construction activities. However, transport, storage, use, and disposal of hazardous materials during operations would be performed in accordance with existing local, state, and federal hazardous material regulations, including the federal RCRA and CERCLA, and CCR Title 22 and Title 26. The project would comply with these laws and regulations, ensuring that potential materials handling would occur in an acceptable manner. Coverage for operational activities would be established under an Individual NPDES/WDR Permit and a SWPPP would be prepared in associate with this permit. NPDES permit-mandated BMPs would govern spill containment during construction activities. Section 3.7, Hydrology and Water Quality, provides a detailed discussion of water quality impacts associated with releases of hazardous materials due to operation of the proposed project.

In summary, hazardous substances and petroleum products would potentially be spilled or exposed during project operations, resulting in health and safety impacts to on-site personnel and/or the environment. However, implementation of standard BMPs, proper transportation, use, storage, and disposal of hazardous materials and petroleum products, in accordance with applicable federal, state, and local regulations would result in less than significant impacts related to hazards and hazardous materials.

Mitigation Measures

As impacts on hazards and hazardous materials would be less than significant, no mitigation is required

Significance of Impacts After Mitigation

Impacts on hazards and hazardous materials would be less than significant.

Impact HAZ-3: The proposed project would not create a significant hazard to the public or environment through the presence of soil or groundwater contamination.

Impacts associated with the potential for the proposed project to result in the contamination of soil and groundwater are discussed in Section 3.5, Geology and Soils, and Section 3.7, respectively.

The proposed project would result in ground disturbing activities during construction including grading and development of the Nature Park, retention basins, and pipelines and during operation and maintenance activities. Contaminated soils and/or groundwater are not expected to be found at the site during construction and/or operational activities. However, workers could encounter previously unknown contaminated soils in which case impacts could include potential localized spread of contaminants as well as expose workers and off-site receptors to health and safety risks. In the event that contaminated soils are discovered during

construction and/or operations, standard regulations are in place that requires reporting and cleanup of any contamination found. As such, the proposed project would result in less than significant impacts related to hazards to the public or the environment through the presence of soil or groundwater contamination.

Mitigation Measures

As impacts on hazards and hazardous materials would be less than significant, no mitigation is required

Significance of Impacts After Mitigation

Impacts on hazards and hazardous materials would be less than significant.

3.6.2.4 Alternative 1 –No In-Channel Recharge Basin

The No In-Channel Recharge Basin Alternative would involve the same construction and operation of facilities as the proposed project with the exception of the in-channel recharge basins. This alternative would not alter the size of the nature park or pipeline lengths or alignments. Under the No In-Channel Recharge Basin Alternative, impacts related to hazards and hazardous materials would be similar in nature to the proposed project. However, this alternative would eliminate hazard and hazardous materials impacts associated with construction and operation of the in-channel basins. As with the proposed project, implementation of this alternative would result in less than significant impacts. As such, the No In-Channel Recharge Basin would be similar to the proposed project relative to hazards and hazardous materials and impacts would be less than significant.

3.6.2.5 Alternative 2 – Reduced Off-Channel Recharge Basin

The Reduced Off-Channel Recharge Basin Alternative would eliminate three off-channel basins located on in approximately 10 acres in the eastern portion of the project site. This area would instead become part of the Nature Park. Additionally, under this alternative the Collector Pipeline would decrease in length as compared to the proposed project and would not run through the proposed nature park Heritage Habitat. This alternative would involve the same construction and operation of facilities as the proposed project with the exception of those items discussed above.

Under the Reduced Off-Channel Recharge Basin Alternative, impacts related to hazards and hazardous materials would be similar in nature to the proposed project. However, this alternative would eliminate hazard and hazardous materials impacts associated with construction and operation of three off-channel basins and would reduce impacts associated with construction and operation of the Collector Pipeline. As with the proposed project, implementation of this alternative would result in less than significant impacts. As such, the Reduced Off-Channel Recharge Basin Alternative would be similar to the proposed project relative to hazards and hazardous materials and impacts would be less than significant.

3.6.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

The Alternative Aqueduct Diversion Pipeline Alignments Alternative would change the location and shorten the length of the aqueduct diversion pipeline. This alternative would involve the same construction and operation of facilities as the proposed project; however construction would occur over a shorter distance because of the reduced pipeline length. Under the Alternative Aqueduct Diversion Pipeline Alignment Alternative, impacts related to hazards and hazardous materials would be similar in nature to the proposed project. However, this alternative would reduce hazard and hazardous materials impacts associated with construction and operation the Aqueduct Diversion Pipeline. As with the proposed project, implementation of this alternative would result in less than significant impacts. As such, the Alternative Aqueduct Diversion

Pipeline Alignments Alternative would be similar to the proposed project relative to hazards and hazardous materials and impacts would be less than significant.

3.6.2.7 Alternative 4 – No Project Alternative

The No Project alternative would involve the construction of approximately 280 residential units on about 50 acres of the project site. It is not expected that residential construction and the subsequent occupation for residential uses would involve the risk of potential significant hazards or hazardous materials. Therefore, the impacts of the No Project Alternative would be less than significant.

3.6.3 Mitigation Measures and Monitoring Program

As no mitigation measures are required to address impacts on land use, no mitigation monitoring program is required.

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3.7 Hydrology and Water Quality

The project proposes to divert water from the State Water Project for groundwater recharge within the UAP. In addition, excess stormwater flows in Amargosa Creek will be diverted during the rainy season to provide additional recharge to the Antelope Valley Groundwater Basin. The analyses presented below evaluate the potential adverse and beneficial effects of the proposed project and Alternatives on the hydrology in the vicinity of the UAP and on both surface water and groundwater quality.

3.7.1 Environmental Setting

3.7.1.1 Area of Influence

The area of influence for assessing project effects on surface hydrology and water quality is the area extending from the California Aqueduct, located west of the proposed project boundary, to the Rosamond Dry Lake, approximately 19 miles north and downstream of the proposed project. This encompasses the area immediately upstream of the project facilities and the entire downstream reach of Amargosa Creek. The area of influence for groundwater affected by proposed recharge operations encompasses an arc extending northeast of the proposed project site for approximately five miles.

3.7.1.2 Setting

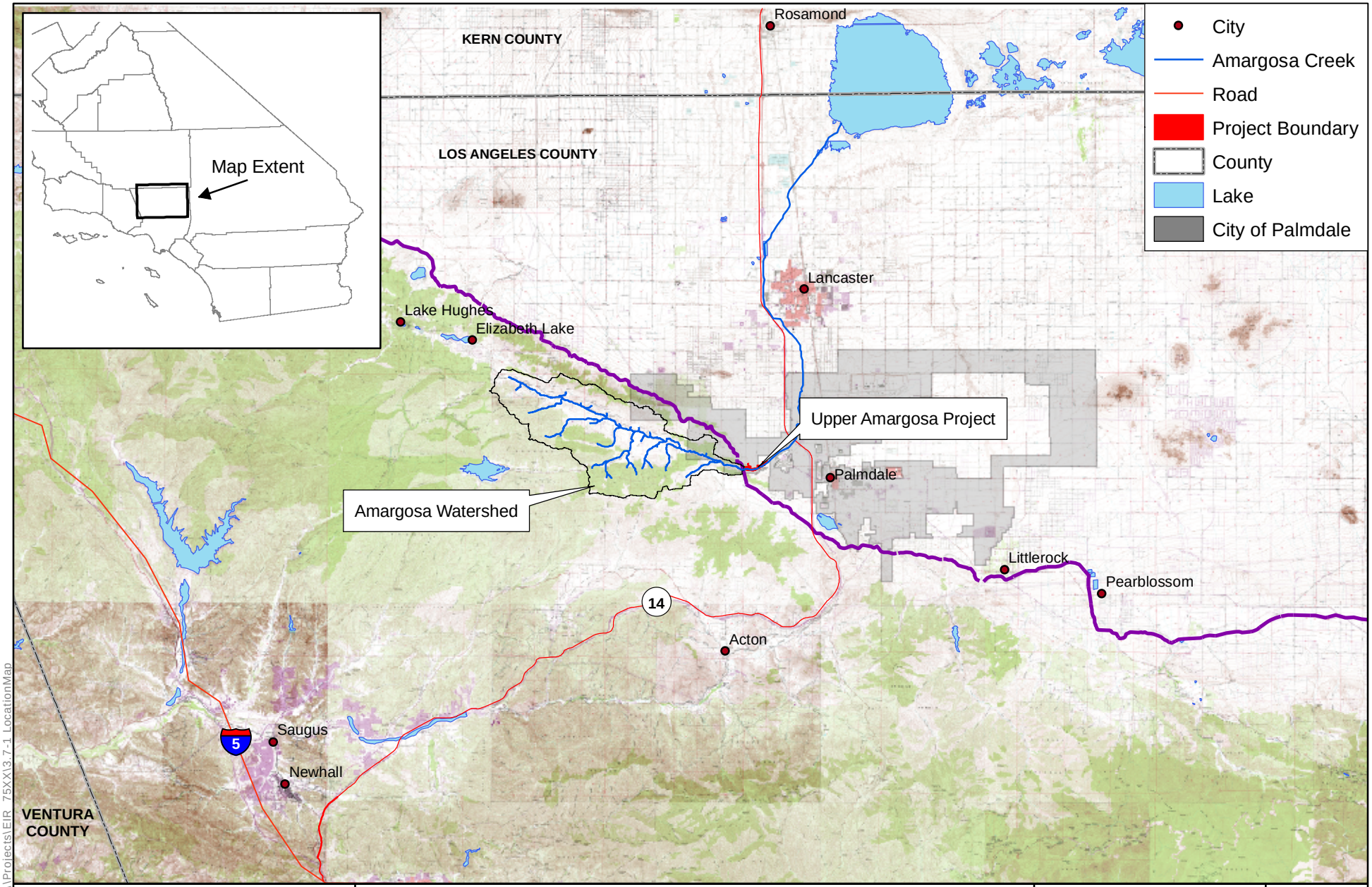
Antelope Valley is a large sediment-filled structural depression that is a down-faulted block between the Garlock and the San Andreas faults. The basin is filled with unconsolidated alluvium and lacustrine (lakebed) deposits. The fine-grained lakebed deposits accumulated in a large lake or marsh that at times covered the area. Alluvial fans that formed by the deposition of eroding materials from the up-faulted block of the Sierra Pelona and San Gabriel Mountains encroached upon the ancient lake deposits, forcing the ancient lake and associated deposition to the north – the present location at Rosamond Dry Lake and Rogers Dry Lake (USGS 2003). The lakebed deposits are overlain by as much as 800 ft of alluvium in the southern part area near Palmdale and become progressively shallower northward, being exposed at the surface near the southern edge of Rosamond Dry Lake and Rogers Dry Lake. Antelope Valley is a hydrologically-closed basin. Water only leaves the basin by evaporation as there is no outlet to the sea. The Amargosa Creek watershed is the area from which the Amargosa Creek accumulates rain runoff on the northern slope of the Sierra Pelona Mountains. It overlies the transition between the up-faulted block of the Sierra Pelona Mountains and the down-faulted block of the Antelope Valley.

3.7.1.2.1 Amargosa Creek Watershed

Amargosa Creek is an isolated stream system beginning in the Sierra Pelona Mountains north of Los Angeles, CA. The creek trends east through the foothills and Leona Valley, then north-east through the City of Palmdale, then north across the Antelope Valley, terminating in Rosamond Dry Lake on Edwards Air Force Base (Figure 3.7-1). The Amargosa Creek watershed upstream of the proposed UAP has a typical elongated palmate-shape. Table 3.7-1 provides the key characteristics of the watershed. Amargosa Creek watershed area upstream of the proposed UAP is approximately two percent of the overall watershed to Rosamond Dry Lake (1,200 square miles) (SAIC WR).

Table 3.7-1. Amargosa Creek Watershed Physical Characteristics

Characteristic	***Value***
Area (sq miles)	29
Highest point (ft MSL)	5,176
Lowest point (ft MSL)	2,765
Flow length (ft)	76,410



NOTES:

Coordinate System: CA State Plane Zone 5 (feet)
Horizontal Datum: NAD 83

Upper Amargosa Project Site Map

0 2 4 8 12 16
Miles

SAIC From Science to Solutions

DATE: 03/13/09 BY: AP

FIGURE: 3.7-1

File: T:\WTR Palmdale\Projects\EIR 75XX\3.7-1 LocationMap

Tables 3.7-2 and 3.7-3 identify key characteristics related to rainfall, streamflow, and anticipated operational parameters.

Table 3.7-2. Amargosa Creek Watershed Rainfall and Streamflow Characteristics

Parameter	*Value*	*Source/Comment*
Rainfall	6.4 in/day	LA County 50-year maximum daily intensity
	15 in/year	Average annual precipitation at Station 122 – Leona Valley
Stream Flow Rate	3,695 cfs	Capital Flood storm event
	2,600 AFY	Average Annual (13 years prorated flow)
	10,000 AFY	Maximum Water Year 1968-1969

Table 3.7-3. Amargosa Creek Proposed Project Operational Parameters

Parameter	*Value*	*Source/Comment*
Proposed Recharge Rate	95 AFD	5 feet per day percolation, 19 acre facility
	24,000 AFY	Average Annual (area is 2/3 operational, 1/3 maintenance)
Diversion Potential	1,100 AFY	Average Annual Water Year
	2,700 AFY	Maximum Water Year
Proposed Diversion Rate (without reducing existing channel seepage)	100 cfs	Instantaneous maximum rate
	400 AFY	Average Annual Water Year
	1,400 AFY	Maximum Water Year

Land use in the Amargosa Creek watershed is predominantly undeveloped, native woodland, scrub, and grasses. Human population is concentrated along the northeast boundary of the watershed within the Leona Valley. Ranching and farming has played a significant role in the history of the valley and many remnant agricultural fields can be found throughout the watershed.

The natural Amargosa Creek watershed above the UAP is incised into bedrock of the Sierra Pelona Mountains. A thin veneer of coarse grained alluvium has accumulated within the drainage network. The natural watershed overlies the San Andreas Fault Zone and has been offset by the right-lateral strike-slip movement between the North America and Pacific tectonic plates.

Bedrock within the natural watershed generally consists of granitic and metaphoric rocks including the Pelona Schist Formation. The younger Anaverde Formation occurs as elongated outcrops associated with the San Andreas Fault Zone, and recent Quaternary alluvial materials have been deposited where streamflow has incised depressions into bedrock. The Pelona Schist Formation is comprised of highly deformed and metamorphosed sedimentary rocks which occur mainly along the San Andreas and Garlock Fault Zones. The granitic rocks are large plutons (intrusive magma bodies that were forced into older rocks under very high pressure). The Anaverde Formation is comprised of Pliocene non-marine fluvial sandstones, lacustrine clays, and thin beds of gypsum evaporate that have been highly deformed by faulting along the San Andreas Fault Zone. Quaternary alluvium is generally comprised of coarse to medium grain granite grus and eroded schist, with minor amounts of silt and clay. Based on borehole data, the alluvium in the natural Amargosa Creek watershed south of the San Andreas Fault is shallow with the bedrock ranging from 8 to 70 feet below the ground surface (ft bgs).

The Amargosa Creek watershed downstream of the UAP is an alluvial fan spreading into the Antelope Valley to the north and east. In this area, the development in the Cities of Palmdale and Lancaster has altered landscape and the pre-existing drainage with engineered drainage systems to capture and convey stormwater from the urban area to Amargosa Creek. The alluvial fan originates in the vicinity of the project from where the Amargosa Creek crosses from the up-faulted block of the mountain front to the down-faulted block under the Antelope Valley. In the Antelope Valley, deposits of medium to coarse grain material overlie the fine

grain clay-like lakebed deposits and the playa lake bed deposits (Ponti et. al., 1981). Borehole and well data confirm the subsurface characteristics of the area beneath Amargosa Creek north of the proposed project. Between the UAP and Avenue J, alluvium occurs to depths of up to 800 feet. Borings made to 30 feet and 70 ft bgs across the Antelope Valley generally show that playa lake bed deposits occur near surface from Avenue J to the north including Rosamond Dry Lake. Wells have been advanced to between 300 feet to 1000 ft bgs across the Antelope Valley, and the logs show ancient lake bed lacustrine deposits occur at approximately 800 feet depth from 10th Street to Avenue J. The coarse grain sediments overlying the lacustrine deposits comprise the unconfined "principal aquifer", and the confined coarse grain sediments below the lacustrine deposits comprise the "deep aquifer". Figure 3.7-2 provides a cross section of the subsurface geology and hydrology derived from these data.

3.7.1.2.2 Aquifer System

A cross-section of the subsurface geology underneath Amargosa Creek from the UAP to Rosamond Dry Lake was prepared from available well logs and borings and shows the dominant geologic features including the significant aquifers and aquitards (features that impede the movement of groundwater) (Figure 3.7-2). The principal aquifer is unconfined alluvium mostly composed of unconsolidated sand and gravel that overlies ancient lake bed deposits. The closest well log near the UAP (approximately ½ mile downstream) shows that bedrock occurs 285 ft bgs (below ground surface) at 2425 feet elevation above mean sea level (MSL). Further downstream (1¼ mile downstream of the UAP) bedrock occurs at 700 ft bgs (1910 feet MSL), suggesting that the bedrock dips steeply from the southwest to the northeast. The unconfined principal aquifer reaches depths of 800 ft bgs downstream from the UAP. Below the unconfined alluvium occurs a series of clay layers deposited as an ancient lake bed with thickness ranging from 100 to 300 ft. These lakebed deposits impede groundwater movement. Therefore, the unconfined surface aquifer is effectively hydrologically isolated from the deeper confined aquifer by the lakebed sediments over a very large area. They are essentially independent water reservoirs. The deep aquifer is confined below the ancient lake bed deposits and its depth is unknown.

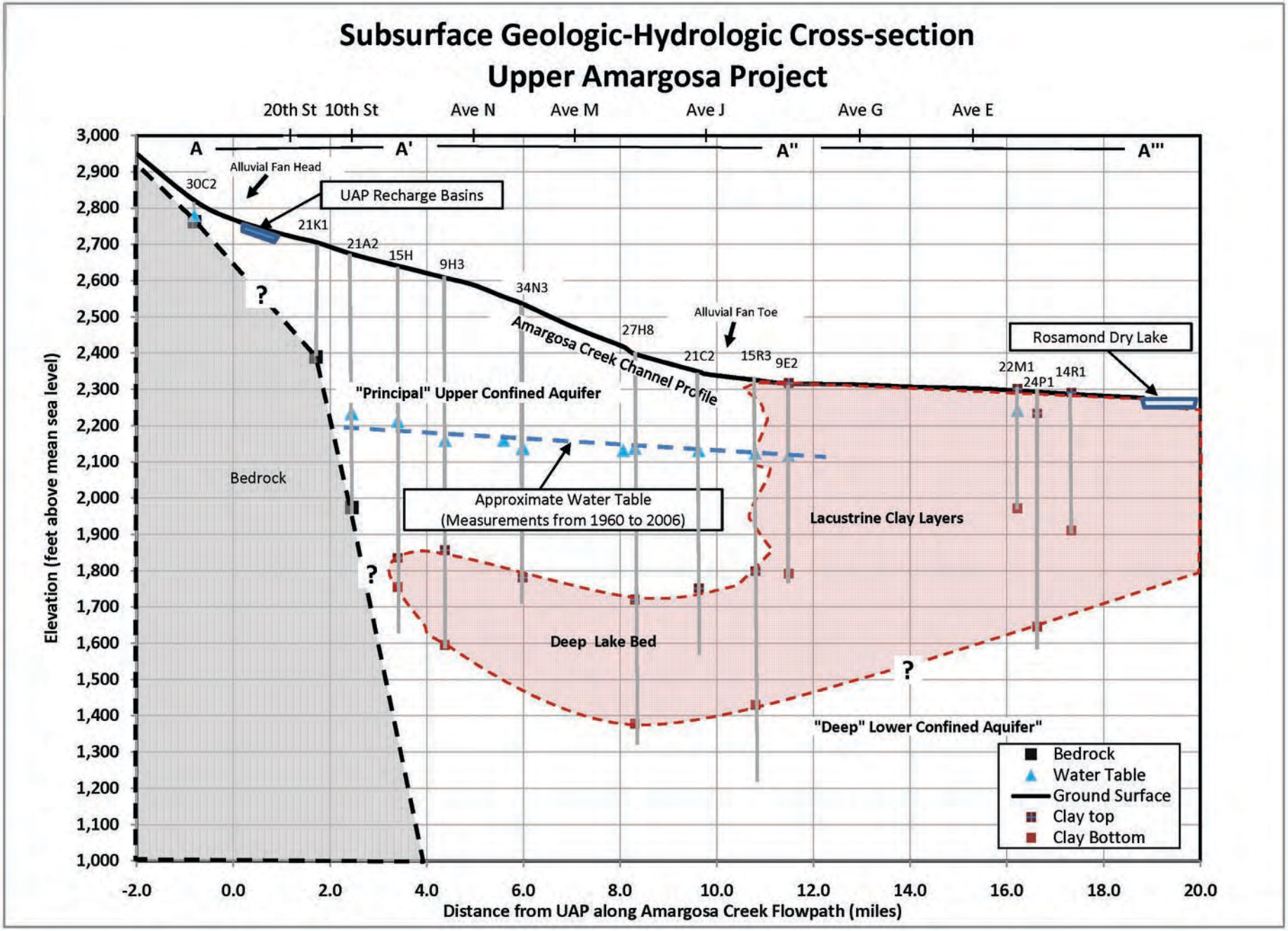
Approximately ten miles downstream of the UAP, there is evidence of near surface middle and upper lake bed deposits in the lithologic logs. Near Avenue J, silts and clays begin to dominate the surface sediments, thereby marking the boundary of the playa deposits mapped by Ponti and others (1981). These surface silts and clays are less permeable and impede water seepage to groundwater below the Amargosa Creek channel bed downstream of Avenue J. Therefore, north of Avenue J seepage of water into the bed of Amargosa Creek would be limited and running water would remain in the creek to discharge into the Ponds and Rosamond Lake farther north.

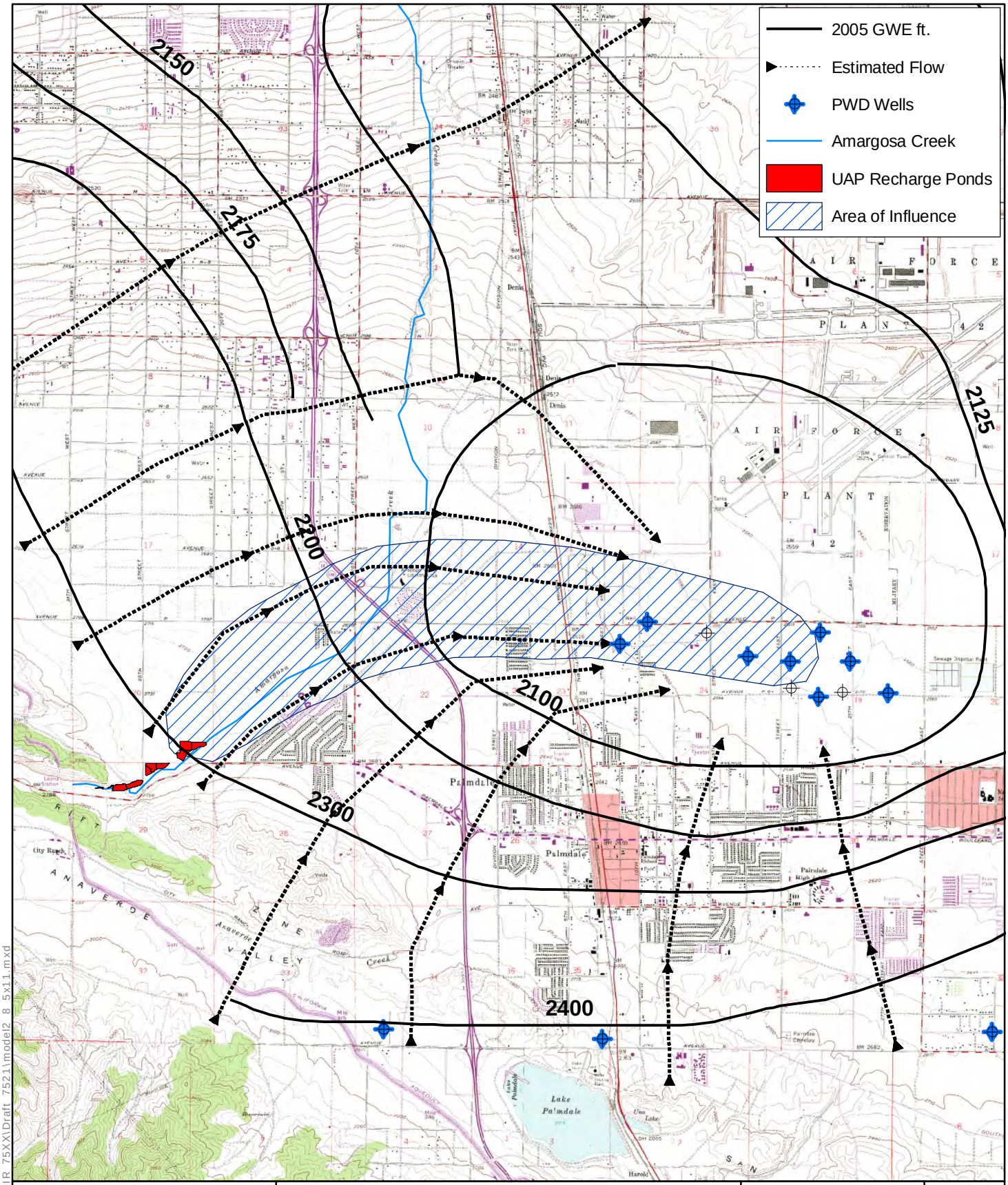
Recharge from the UAP would infiltrate into the upper layers of the alluvium and flow by gravity along the groundwater gradient in the vicinity of the project. Based on the current understanding of groundwater movement in the area, water recharged at the project site would flow in an arc toward the northeast and east as indicated on Figure 3.7-3.

3.7.1.2.3 Rainfall

Most of the rainfall in the Amargosa Creek watershed occurs from mid-latitude Pacific cyclonic storms during the winter. There are six rain gages surrounding the Amargosa Creek watershed and one gage inside the Amargosa Creek watershed [Station No 122]. Figure 3.7-4 shows the locations of the rain gauges used to estimate rainfall. The average annual rainfall for the period of record from each gage demonstrates a strong west to east decreasing gradient ranging from 18 inches each year (in/yr) to 7 (in/yr). This gradient is typical of a rainshadow effect on the leeward side of a mountain range. On average, rainfall occurs on 38 days each year in the mountains and 26 days each year in the Antelope Valley. The daily rainfall on average exceeds 1 inch on six days each year in the mountains and 2 days each year in the Antelope Valley (SAIC 2008).

FIGURE 3.7-2


Subsurface Geologic-Hydrologic Cross-section
Upper Amargosa Project
20th St
10th St
Ave N
Ave M
Ave J
Ave G
Ave E
A
A'
A''
A'''
Alluvial Fan Head
UAP Recharge Basins
30C2
21K1
21A2
15H
9H3
34N3
27H8
21C2
15R3
9E2
22M1
24P1
14R1
Alluvial Fan Toe
Amargosa Creek Channel Profile
Rosamond Dry Lake
"Principal" Upper Confined Aquifer
Bedrock
Approximate Water Table
(Measurements from 1960 to 2006)
Lacustrine Clay Layers
Deep Lake Bed
"Deep" Lower Confined Aquifer
Bedrock
Water Table
Ground Surface
Clay top
Clay Bottom
Elevation (feet above mean sea level)
3,000
2,900
2,800
2,700
2,600
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
Distance from UAP along Amargosa Creek Flowpath (miles)



NOTES:

Coordinate System: UTM Zone 11N
Horizontal Datum: NAD 83

Topo Map - USGS 24k Quads

Groundwater Contours from 2008 Problem Statement for the Antelope Valley Area of Adjudication

Upper Amargosa Project Area of Influence

0 0.25 0.5 1 1.5 2

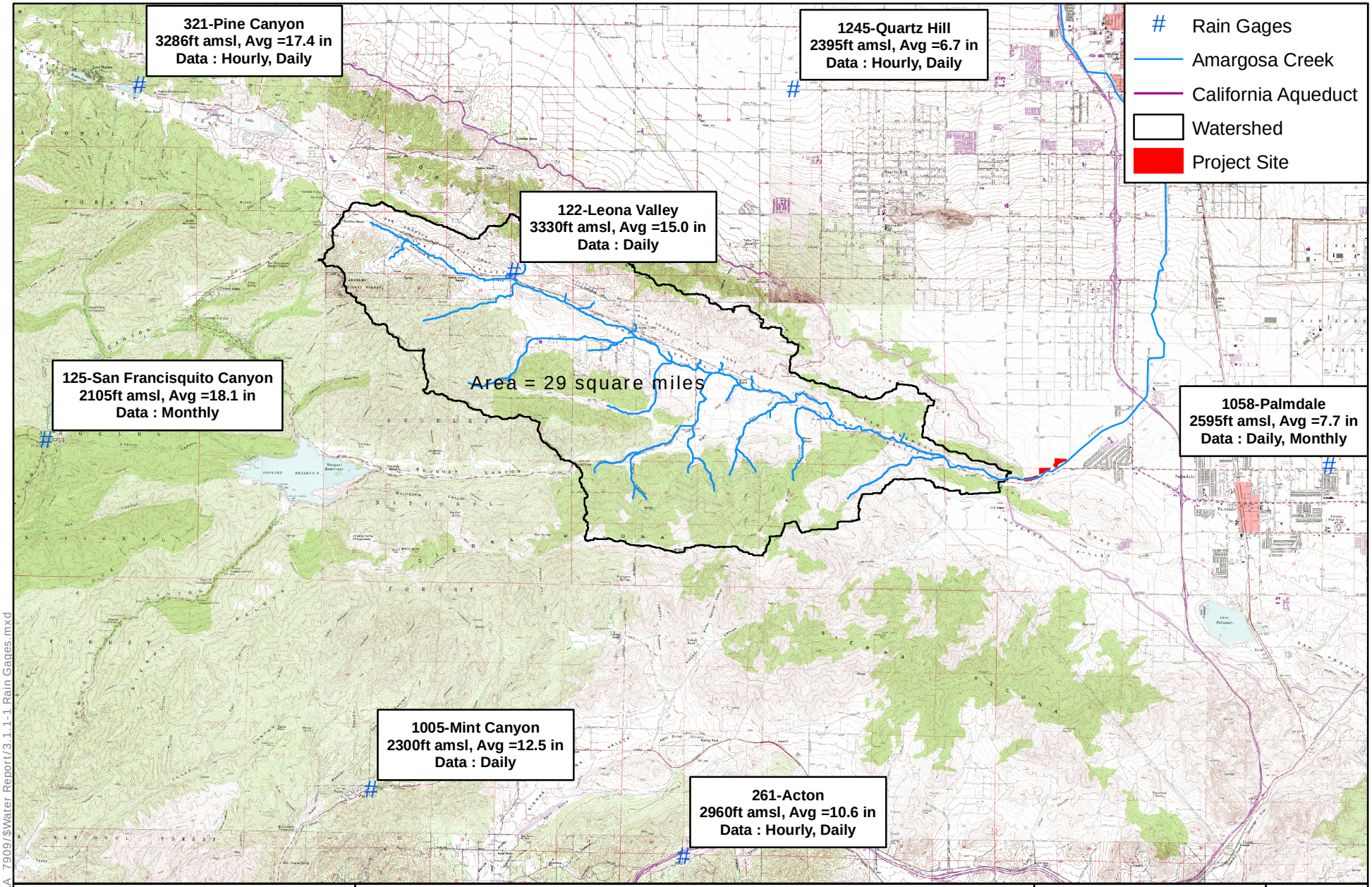
Miles

SAIC From Science to Solutions

FIGURE: 3.7-3

DATE: 02/10/2009 BY: C. Woods

File: \Palmdale\Projects\EIR 75XX\Draft 7521\model2 8 5x11.mxd



NOTES:
Base Map: USGS Quadrangles
Ritter Ridge, Del Sur, Sleepy Valley, and Lancaster West
Coordinate System: UTM Zone 11N
Horizontal Datum: NAD 83

Amargosa Creek Watershed
Rain Gages

0 0.5 1 2 3 4
Miles

SAIC
From Science to Solutions

DATE: 10/03/08
BY: J. Degner

FIGURE:
3.7-4

File: WTR-Palmdale/WAA_7909/$Water Report/3.1.1-1 Rain Gages.mxd

Table 3.7-4: Amargosa Creek Watershed Rainfall Gages.

Station Number	*Station Name*	*Measurement Interval [Period of Record]*	*Latitude*	*Longitude*	*Gage Elevation (ft msl)*	*Average Period of Record (in/yr)*
122	Leona Valley	Daily [1929 to 1992]	34.6311	-118.3228	3330	15.0
125	San Francisquito Canyon	Monthly [1919 to 2007]	34.5903	-118.4542	2105	18.1
261	Acton - Escondido	Daily [1897 to 2008] Hourly [1996 to 2008]	34.4950	-118.2728	2960	10.6
321	Pine Canyon Control Station	Daily [1931 to 2008] Hourly [1997 to 2008]	34.6733	-118.4292	3286	17.4
1005	Mint Canyon Fire Station	Daily [1946 to 2005]	34.5097	-118.3611	2300	12.5
1058	Palmdale	Monthly [1931 to 2007] Daily [1953 to 2008]	34.5881	-118.0919	2595	7.7
1245	Quartz Hill	Daily [1986 to 2007] Hourly [1998 to 2008]	34.6744	-118.2444	2395	6.7

Two USGS stream gage stations have been installed on tributaries of Amargosa Creek (10264520 - Amargosa Creek Tributary near Leona Valley and 10264530 - Pine Creek near Palmdale). The Amargosa Creek Tributary station has a drainage area of 0.05 square miles and annual peak flows were measured intermittently from 1959 to 1987 ranging from 0 cfs to 19 cfs (SAIC WR). The Pine Creek station has a drainage area of 1.78 square miles and annual peak flows were measured from 1958 to 2006 ranging from 0 cfs to 120 cfs. There are no historical gaging station runoff data from the mainstem of Amargosa Creek (SAIC WR). Because rainfall occurs infrequently throughout the year and annual totals are low, Amargosa Creek is considered an ephemeral stream with runoff occurring only during periods of intense rainfall (Metzger et al 2002). The US Army Corps of Engineers has determined that Amargosa Creek is not a jurisdictional water of the U.S. based on isolation from navigable waters of the U.S. (Corps Determination of No Jurisdiction 2004-01298-AOA). The Corps has determined that Amargosa Creek is an isolated water of the State. Therefore, the creek is considered jurisdictional water regulated by the California Department of Fish and Game (CDFG) and the Lahontan Regional Water Quality Control Board (LRWQCB).

A daily runoff watershed model was used to simulate the daily runoff from the Amargosa Creek watershed for assistance with the planning of the UAP (SAIC WR). Table 3.7-5 provides an overview of the simulation data. Over the 13-year period of analysis, the average runoff was estimated to be 2,600 AFY. The maximum annual runoff for the period of analysis occurred in Water Year 1968-69 and is estimated to be 10,000 AFY.

Table 3.7-5: Pro-rated Monthly Flows in Amargosa Creek (in Acre-feet)

Year	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Water Year(Oct-Sep)*
1964									0	0	0	62	
1965	16	0	6	152	0	0	0	0	0	0	4,168	4,045	236
1966	75	254	0	0	0	0	0	0	0	0	147	2,177	8,541
1967	239	0	345	1,106	0	0	0	0	2	0	1,061	120	4,016
1968	45	140	130	51	0	0	0	0	0	0	6	20	1,547
1969	4,979	3,877	347	736	0	0	40	0	0	0	64	0	10,004
1970	11	186	824	0	0	0	0	0	0	0	569	286	1,085
1971	120	61	75	64	9	0	0	0	0	0	6	1,139	1,185
1972	0	0	0	0	0	0	0	0	0	0	16	0	1,145
1973	146	2,042	868	0	0	0	0	0	0	0	21	0	3,071
1974	53	0	347	225	0	0	0	0	0	4	0	71	646
1975	0	79	644	451	0	0	0	0	0	0	0	0	1,249
1976	0	389	179	87	0	0	0	0	218	0	8	3	874
1977	117	27	43	0	214	0	0	0	0	0	0	0	413
Average	**446**	**543**	**293**	**221**	**17**	**0**	**3**	**0**	**16**	**0**	**433**	**566**	**2,616**

3.7.1.2.4 Water Quality

Surface Water Quality

The Recharge Facility would receive water from two sources, the State Water Project Water and the Amargosa Creek watershed. There are no surface water quality measurements from Amargosa Creek. However, the hydrology (ephemeral, intermittent flows occurring with intense rainfall) would suggest runoff with low dissolved solids concentrations since the limited duration of events would not permit time for minerals to become dissolved in the rainwater runoff.

The water quality of the SWP ranges from 124 to 368 mg/L with an average of 233 mg/L. This is below the range of of TDS discussed below for groundwater. Therefore, dissolved minerals in both surface sources are expected be less than those in the groundwater.

Groundwater Quality

Groundwater quality data were compiled from the Department of Health Services and the USGS (AVTC 2008). Overall, there are six wells in the vicinity of the proposed project for which water quality data are available. Table 3.7-6 summarizes the available data. The table identifies the well, year of maximum sample concentration and compares it to the maximum contaminant level (MCL) established for drinking water. Figure 3.7-5 shows the locations of the wells were water quality data exists. Total Dissolved Solids, Nitrates, and Arsenic are used as key indicators of water quality because they are the ones of most concern.

Table 3.7-6: Maximum Recorded Contaminant Levels in Wells Near the UAP

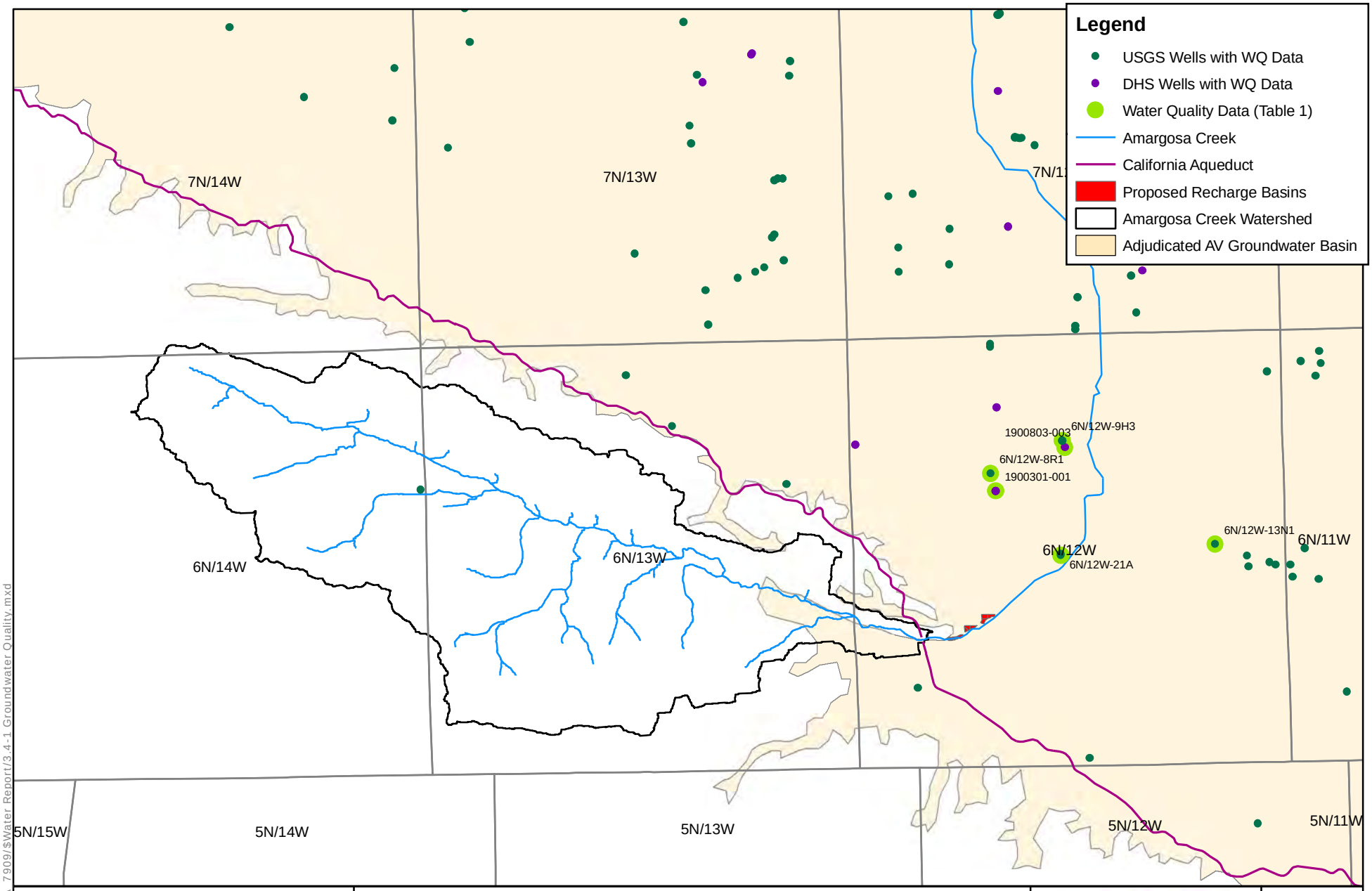
Well No	*Total Dissolved Solids (mg/L)*			*Nitrates (as NO_3) (mg/L)*			*Arsenic (mcg/L)*		
	Year	**Value**	**Var to MCL = 500**	**Year**	**Value**	**Var to MCL = 45**	**Year**	**Value**	**Var to MCL = 10**
USGS									
6N/12W-8R1	1972	815	+315	1972	3.5	-41.5	1964	3	-7
6N/12W-9H3	2002	573	+73	-	-	-	2002	2	-8
6N/12W-13N1	1976	195	-305	1974	3.3	-41.7	1968	0	--10
6N/12W-21A1	1966	786	+286	1966	8	-37	-	-	-
DHS									
1900301-001	2001	980	+480	2001	17	-28	2001	0	-10
1900803-003	2003	600	+100	2005	6	-39	2003	0	-10

3.7.1.3 Regulatory Setting

Many laws and regulations apply to water quality and water rights. The following sections discuss those most directly applicable to the UAP proposal.

3.7.1.3.1 Federal Law

The Federal Water Pollution Control Act, also called The Clean Water Act (33 U.S.C.1251) governs water pollution prevention and control throughout the United States. Federal water quality regulations are administered by the EPA. The State Water Resourced Control Board and other state agencies implement these regulations via delegations of Federal Authority. The 1972 amendments to the federal Water Pollution Control Act established the National Pollutant Discharge Elimination System (NPDES) permit program to control discharges of pollutants to water bodies. The 1987 amendments to the Clean Water Act created a new section of the act devoted to stormwater pollution prevention permitting. Construction activities are regulated



File: Palmdale/TB_WAA_7909/$Water Report/3.4-1 Groundwater Quality.mxd

NOTES:

Coordinate System: GCS North American 1983
Horizontal Datum: NAD 83

Wells with Water Quality Data

0 0.5 1 2 3 4
Miles

SAIC From Science to Solutions

DATE: 07-21-08 BY: JD

FIGURE:

3.7-5

under the General Construction Permit, which requires preparation of a Stormwater Pollution Prevention Plan (SWPPP) when the total amount of ground disturbance during construction exceeds 1 acre. The SWPPP includes pollution prevention measures (erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills), demonstration of compliance with all applicable local and regional erosion and sediment control standards, identification of responsible parties, a detailed construction timeline, and a BMPs monitoring and maintenance schedule. The Lahontan Regional Water Quality Control Board enforces the General Construction Permit in this area.

3.7.1.3.2 State Law

The Porter-Cologne Water Quality Control Act established the State Water Resources Control Board and the Regional Water Quality Control Boards to regulate water quality throughout the state. The Act specifically designates the SWRCB as "state water pollution control agency for all purposes stated in the Federal Water Pollution Control Act and any other federal act, heretofore or hereafter enacted…." The SWRCB administers water rights in California and oversees the nine Regional Water Quality Control Boards.

The Lahontan Regional Water Quality Control Board designates beneficial uses of surface and groundwater resources for the project area and establishes applicable water quality objectives in the Water Quality Control Plan for the Lahontan Region, North and South Basins (California Regional Water Quality Control Board, Lahontan Region 1994). Waters of the South Lahontan Basin drain into closed basin remnants of prehistoric lakes. The Antelope Valley Hydrologic Unit is in the South Lahontan Basin. The Lahontan Board has allowed the use of State Water Project water for groundwater recharge and storage for decades provided that such recharge does not result in degradation of indigenous water supplies. Groundwater can be used for agricultural, municipal, and industrial use. Both waters can also be used for fresh water replenishment.

The SWRCB also administers water rights in California with the objective to ensure that the State's waters are put to the best possible use, and that the public interest is served. The permit process to obtain an appropriative right is governed by California Water Code.

3.7.1.3.3 Adjudication of the Antelope Valley Groundwater Basin

In 1999, W.M. Bolthouse Farms, Inc. and Diamond Farming Company initiated lawsuits against various municipal groundwater pumpers within the Antelope Valley, claiming that the ability of agricultural interests to pump groundwater in a cost-effective manner was being impaired due to increased pumping by municipal users. In September 2004, the Los Angeles Department of Public Works filed a cross complaint seeking to quantify the rights to groundwater in the Antelope Valley. These complaints have resulted in a process called court adjudication wherein the court studies available data and decides on an equitable allocation of water rights based on the water that is shown to be available.

3.7.2 Impacts and Mitigation Measures

3.7.2.1 Methodology

The focus of the impact analysis is to assess the effect of the project on the surface water resources associated with Amargosa Creek and the groundwater resources in the Antelope Valley in the vicinity of the proposed project. Since the intent of the project is to capture surface waters and facilitate recharging the local groundwater aquifer, these two water resource areas are closely related.

The analysis evaluates the potential water quality effects including the effect of diverting water from Amargosa Creek for recharge on water quality in Amargosa Creek, and the effect of recharging SWP and Amargosa Creek water to the local area of the Antelope Valley Aquifer.

The analysis also assesses the potential of the project to affect water supplies, including surface water or groundwater hydrology and the implications thereof. For example, access to water downstream could theoretically be adversely affected by upstream diversions.

3.7.2.2 Significance Criteria

The CEQA Guidelines Appendix G Environmental Checklist Form defines significance criteria for water quality. Because groundwater and surface water are interrelated by the recharge component of the proposed project, the Appendix G criteria are modified here to more directly reflect the specific situation of this project. Therefore, the proposed project would have a significant effect on water resources if it would result in one or more of the following:

WR-1: Cause a substantial adverse change in surface water or groundwater availability.

WR-2: Cause a substantial adverse change in surface water or groundwater quality.

WR-3: Substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

3.7.2.3 Impacts of the Proposed Project

The purpose of the proposed project is to increase groundwater recharge to the Antelope Valley Groundwater Basin by capturing and diverting SWP from the California Aqueduct and excess stormwater flows from Amargosa Creek. Operation of the UAP will increase groundwater levels in the project vicinity and provide additional groundwater to the Antelope Valley Groundwater Basin that would otherwise be lost to evaporation or could not otherwise be utilized. Based on operation schedules, basin size (20 acres), water availability, and expected infiltration rates, the estimates of potential annual recharge from the UAP range from 14,500 AF to 53,000 AF, but are expected to average 24,000 AF.

3.7.2.3.1 Construction Impacts

Construction of the proposed project involves approximately a year during which grading will occur and pipe and other plumbing items would be installed. Construction will involve excavation of trenches for pipes, grading for the recharge basins, and constructing the berms enclosing the basins. Cut and fill will be balanced. Engineered slope stabilization will be installed to prevent erosion of the berms near the creek. There will be limited construction within the streambed to construct the diversion facility and install the in-channel berms.

Impact WR-1: Proposed project construction would not cause a substantial adverse change in surface water or groundwater availability.

Construction will not involve activities that could cause a substantial adverse change in surface water or groundwater availability. While water may be applied for dust control, the amount would be minimal, much of it would evaporate, and water application for dust control is not expected to adversely affect either surface water or groundwater availability in the project vicinity.

The impact would be less than significant.

Mitigation Measures

No mitigation is required.

Significance of Impacts after Mitigation

Impacts of project construction on surface or groundwater quality would be less than significant.

Impact WR-2: Proposed project construction would potentially cause a substantial adverse change in surface water or groundwater quality.

Construction could involve activities that could cause a substantial adverse change in surface water quality. Ground disturbance would be limited to grading near the surface. Grading and construction would occur in the creekbed to install the diversion structures and the in-stream recharge basins. If construction occurs in the stream channel during the rainy season, there is a potential for equipment to be in the stream channel during a sudden runoff event. Should the equipment not be removed, there is the potential for leakage of fuel, fluids, or lubricants to enter the creek. The release of contaminants into the creek would be considered adverse and significant.

The impact would be potentially significant.

Mitigation Measures

WR-2a: In order to prevent equipment from releasing hazardous materials into the creek in sudden runoff events, construction of in-channel facilities shall not occur if an imminent storm event is expected. In-channel construction may resume once the channel dries sufficiently to support equipment. No equipment shall be left in the creek bed overnight or over weekend non-work periods.

Significance of Impacts after Mitigation

With the implementation of Mitigation measure WR-2a, impacts of project construction on surface or groundwater quality would be less than significant.

Impact WR-3: Proposed project construction would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

Construction would involve the installation of a diversion facility and the construction of earthen berms within the channel for the in-channel recharge basins. Both of these would involve altering to some extent the natural streamflow of Amargosa Creek. The diversion facility will be mostly off-channel and adjacent to and integrated with an existing armoring of the channel. However, the in-channel basins are intended to capture in-stream flows and would have the effect of altering the course of the creek by reducing the flow rate, although not to the extent of resulting in off-site flooding or other adverse effects.

If construction occurs in the stream channel during the rainy season, there is a potential for partially constructed facilities or equipment to be in the stream channel during a runoff event. These obstructions could alter the stream course and potentially cause flooding off-site. This impact is potentially significant.

Mitigation Measure

WR-3a: In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall cease prior to an expected imminent storm event. If a partially constructed berm is in place, it shall be removed if there is a chance it would alter the course of Amargosa Creek or result in off-site flooding. No equipment shall be left in the creek bed overnight or over the weekend non-work periods.

Significance of Impacts after Mitigation

With implementation of Mitigation Measure WR-3a, the impact on existing drainage patterns would be less than significant.

3.7.2.3.2 Operation Impacts

Project operation would involve periodic diversion of water from the California Aqueduct when water is available within existing allocations and the capture of excess stormwater flows from Amargosa Creek during the rainy season (see box). In addition, the recharge basins would periodically be maintained to minimize vegetation growth and maintain structural integrity. Landscape maintenance would be undertaken, especially during the revegetation period immediately following project construction, but would be intermittent.

> The City of Palmdale has applied to the State Water Resources Control Board for the right to appropriate water from Amargosa Creek. The application seeks to divert up to 2,700 acre feet per year from Amargosa Creek at a maximum rate of 100 cubic feet per second during the rainy season (October 1 to May 31) when excess water is present in the creek. The project would divert only that portion of the flow not necessary to support downstream uses, including habitat values. Therefore, in most years, the full 2,700 acre feet could not be diverted while ensuring sufficient flow to support downstream uses. A lesser amount would be diverted in these years, which amount may be zero in dry years. In some very wet years, more than 2,700 acre feet could theoretically be available. However, the maximum diversion in any given year, even if very wet, would be 2,700 acre feet.

Impact WR-1: Proposed project operation would potentially cause a substantial favorable change in surface water or groundwater availability and would not cause a substantial adverse change in surface water availability.

By retaining and recharging stormwater, the project could reduce the natural volume of surface water which flows beyond the UAP within Amargosa Creek in some circumstances. However, the project would be operated to capture only excess water that does not seep into the ground under the channel and that cannot otherwise be utilized (that is, water in excess of downstream needs) and divert this water for beneficial use. Project operational procedures provide that stormwater flow for each event would not be diverted until sufficient flow has passed downstream to ensure downstream uses, including habitat maintenance, are not curtailed. Once the minimum flow necessary for this purpose had been allowed to pass, diversion of 100 cfs would commence for the duration of the event.

All SWP project diversions would be directed solely to the recharge basins. Therefore, no SWP water would flow downstream of the UAP.

A query of the SWRCB's online water rights database, the electronic Water Rights Information Management System (eWRIMS), returned 12 licensed appropriative surface water rights located upstream of the 25th Street West crossing of Amargosa Creek [SWRCB 2007] and no licensed water rights located downstream of the crossing (that is, downstream of the proposed project). Therefore, there being no established downstream surface water rights, the proposed project would have no effect on existing downstream surface water rights.

While there are no downstream surface water rights, a portion of the Amargosa flow seeps into the channel bed and recharges the aquifer, especially south of Avenue J. North of Avenue J, the surface sediments are finer sediment lakebed deposits and very little creek water is expected to seep into the ground between Avenue J and the Piute Ponds. The water that does not seep beneath the streambed ultimately flows into the Piute Ponds and Rosamond Dry Lake where it evaporates. Downstream of the UAP, groundwater users with

overlying groundwater rights pump water from the aquifer. Therefore there is a downstream need to maintain the existing channel seepage in order to not adversely affect the downstream overlying groundwater users. An additional downstream water use is the seasonal flooding of Rosamond Dry Lake to maintain the dry lake bottom for an emergency landing zone for Edwards Air Force Base. These rights and uses would not be infringed by the project.

The City of Palmdale application to appropriate water requested up to 2,700 AFY as a maximum diversion rate based on the diversion capacity and the recharge capacity. In order to maintain the existing channel seepage, the project operational procedures would only permit diverting water when there are sufficient flows downstream to support downstream uses (i.e. existing channel seepage). Based on watershed and channel seepage modeling, maintaining the existing channel seepage would reduce the maximum annual diversion potential of 2,700 to a maximum proposed diversion of 1,400 AFY and the average annual diversion potential of 1,100 AFY to an average annual proposed diversion of 400 AFY (Table 3.7-3, SAIC WR). Stream gages will be installed at the point of diversion to more accurately estimate these values during the verification period for the water right permit.

The proposed diversion, which would maintain existing channel seepage, would reduce the average surface water availability immediately downstream of the UAP by fifteen percent on average from 2,600 AFY to 2,200 AFY. Downstream of the UAP, the cities of Palmdale and Lancaster have expanded over time. Because of extensive urban development and paving, which prevents rainwater from seeping into the ground and diverts it through the storm drain system to local drainages, including Amargosa Creek, these developed areas have increased the amount of flow in the Amargosa Creek compared to natural conditions downstream of the cities. In undeveloped areas, rainfall lands on vegetation and soil. The precipitation is temporarily stored on vegetation, in the soil or in surface depressions. The water then evaporates or seeps through the soil as subsurface flow. In urban areas, much of the land is covered by impermeable surfaces such as roads, buildings, parking lots and sidewalks. These features prevent most rainfall from seeping into the soil. The result is faster overland flow of water, which is diverted to natural drainages, and more rapid rise of Amargosa creek and higher peak discharge rates downstream of the storm drain discharges. This means that the urbanization of the Amargosa watershed has lead to more water flowing downstream of the cities during storm events than would occur if the watershed was in a natural state. The contributing urban runoff increases the existing streamflow at Avenue J to 3,700 AFY on average, and the resulting flows with the proposed diversion would be 3,300 AF, or an eleven percent reduction. Further downstream of Avenue J, the reduction in surface water availability as a percentage becomes smaller with the additional contributing runoff to Amargosa Creek. At Rosamond Dry Lake, the reduction in surface water availability is less than one percent (SAIC WR). Therefore the proposed diversion would have a less than significant impact on the downstream need for seasonal flooding.

Conditions for recharge at the UAP are particularly favorable. The facility is at the head of the alluvial fan created by Amargosa Creek, in an area with porous soils, and above the unconfined upper aquifer of the Antelope Valley Groundwater Basin. Water diverted at this location to the recharge basins has a high likelihood of contributing significant volumes of water to the groundwater basin. Water in the creek north of Avenue J is a much lower chance to contribute to the groundwater basin since the water cannot percolate readily into the ground in that area.

Therefore, the proposed project would cause a substantial favorable change in groundwater availability by virtue of its ability to readily capture water that otherwise would not recharge the groundwater basin and increase the availability of groundwater for withdrawal within the Antelope Valley Groundwater Basin.

Mitigation Measures

WR-1a: In order to maintain the existing channel seepage for downstream overlying groundwater users, the streamflow shall be monitored at the POD to ensure sufficient flows past the POD to the meet the downstream channel seepage requirements.

Significance of Impacts After Mitigation

Impacts of project operation on groundwater availability would be significant and favorable by virtue of adding an average of 24,000 acre feet per year to the groundwater basin.

Impacts of the project on surface water availability would be less than significant.

Impact WR-2: Proposed project operation would not cause a substantial adverse change in surface water or groundwater quality.

Amargosa Creek water naturally recharges the groundwater basin, so there would be no change to groundwater quality related to the diversion and recharge of Amargosa Creek water. As noted above, the range of TDS in SWP water is somewhat lower overall than that of water within the Antelope Valley Groundwater Basin. Recharging with water containing fewer dissolved minerals would not adversely affect groundwater quality and may even slightly improve it in the vicinity of the project.

If water used for recharge were to contain unacceptable levels of contaminants over long periods of time, there could eventually be an increase the concentrations of those contaminants within the aquifer, leading to a degradation of overall groundwater quality. Under such circumstances, groundwater quality would be degraded by the recharge project. However, this is very unlikely to occur for several reasons.

First, the quality of Amargosa Creek water will not be altered by the proposed project. Natural and enhanced recharge from Amargosa Creek water would therefore not have an adverse effect on groundwater quality. Second, while State Water Project water varies in quality, it is on average lower in TDS (a key measure of quality) than the groundwater. Therefore the TDS content of SWP water would not adversely affect groundwater quality. Occasionally, concentrations of other contaminants in SWP water may exceed health-based standards for human consumption. A routine chemical, physical, and biological monitoring program has been implemented as indicated in the following statement from the SWP website:

> *Today, chemical, physical and biological parameters are routinely monitored throughout the SWP (from the Feather River drainage in the north to Lake Perris in the south) including more than 40 sites and over 200 individual chemicals. Both discrete (grab) samples and continuous automated station data comprise a comprehensive water quality monitoring program. This extensive water quality monitoring program provides water quality data to: 1) document special and temporal changes in SWP water quality; 2) plan water treatment operational changes; 3) identify and respond to pollution or other water quality episodes; 4) compare SWP water quality to drinking water standards, Article 19 contractual requirements, or other criteria.*

However, regardless of contaminants, if any, SWP water recharged to the aquifer will gradually mingle with water already in the ground, thereby lowering the concentrations of contaminants considerably by dilution in the much larger volume of groundwater compared to the amount that is recharged, assuming the groundwater has lower concentrations. In addition, water withdrawn for human consumption would be required to be treated and tested to verify it meets drinking water standards. Considering the routine testing and monitoring of SWP water, the substantial dilution that would occur within the aquifer, and the requirement for treatment

prior to delivery to customers, the potential for the UAP to contribute to an adverse change in groundwater quality is minimal and not considered significant.

Mitigation Measures

Provided withdrawn groundwater is treated prior to use for human consumption and tested according to all regulatory requirements, no mitigation is required.

Significance of Impacts After Mitigation

Impacts of project operation on groundwater quality would be less than significant.

Impact WR-3: Proposed project operation would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

Project operations would involve the periodic installation of earthen berms within the creekbed for the in-channel recharge basins. Two approximately three foot high earthen berms, made of streambed sediments, would be installed between the diversion facility and the 25th Street West Bridge. To ensure that adequate streamflow occurs prior to diverting flows from Amargosa Creek, the berms would be designed such that a minimum flow would be able to pass through gaps or temporary pipes in the berms to allow a sufficient quantity of the first pulse of storm water to flow downstream. The in-channel basins are intended to capture in-stream flows and would have the effect of altering the course of the creek by reducing the flow rate, although not to the extent of resulting in off-site flooding or other adverse effects. Because the berms would be made of streambed sediments, they would erode rapidly once breached. Sudden breaching of a berm could cause a pulse of water for an unknown distance downstream with a minimal potential for flooding since the creek banks downstream of the project are armored for approximately 2.7 miles. In addition, there is the potential for a portion of an earthen berm to fail on one side of the channel, thereby concentrating flow in that location rather than where it would otherwise naturally occur. This could temporarily alter the streambed topography and the course of the creek. However, the berms are in a relatively flat portion of the streambed that is up to 300 feet wide. The channel naturally meanders within this bed and a short term change in the location of maximum flow within this width would not be considered a significant effect.

If the berms in the channel are breached after a runoff event, the berms would need to be reconstructed in preparation for the next runoff event. If reconstruction of berms occurs in the stream channel during the rainy season, there is a potential for partially constructed facilities or equipment to be in the stream channel during a sudden runoff event. These obstructions could alter the stream course. This impact is potentially significant.

Mitigation Measure

WR-3a: In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall cease prior to an expected imminent storm event. If a partially constructed berm is in place, it shall be removed if there is a chance it would alter the course of Amargosa Creek or result in off-site flooding. No equipment shall be left in the creek bed overnight or over the weekend non-work periods.

Significance of Impacts After Mitigation

With implementation of Mitigation Measure WR-3a, the impact on existing drainage patterns would be less than significant.

3.7.2.4 Alternative 1 – No In-Stream Recharge Basins

Alternative 1 would involve most of the construction and operation features of the proposed project except the in-channel recharge basins. The two three-foot berms within the stream channel between the diversion facility and the 25th Street West Bridge would not be built or maintained. In all other respects, Alternative 1 would be similar to the proposed project.

3.7.2.4.1 Construction Impacts

Construction of Alternative 1 would involve somewhat less in-channel disturbance since the in-channel basins would not be constructed. However, the diversion facility would still need to be constructed and would involve some in-channel construction. Otherwise, construction of Alternative 1 would be the same as for the proposed project.

Impact WR-1: Alternative 1 construction would not cause a substantial adverse change in surface water or groundwater availability.

Construction of Alternative 1 would not involve activities that could cause a substantial adverse change in surface water or groundwater availability.

The impact would be less than significant.

Mitigation Measures

No mitigation is required.

Significance of Impacts After Mitigation

Impacts of Alternative 1 construction on surface or groundwater quality would be less than significant.

Impact WR-2: Alternative 1 construction would potentially cause a substantial adverse change in surface water or groundwater quality.

As for the proposed project, if construction occurs in the stream channel during the rainy season, there is a potential for equipment to be in the stream channel during a sudden runoff event. Should the equipment not be removed, there is the potential for leakage of fuel, fluids, or lubricants to enter the creek. The release of contaminants into the creek would be considered adverse and significant.

The impact would be potentially significant.

Mitigation Measures

WR-2a: In order to prevent equipment from releasing hazardous materials into the creek in sudden runoff events, construction of in-channel facilities shall not occur if an imminent storm event is expected. In-channel construction may resume once the channel dries sufficiently to support equipment. No equipment shall be left in the creek bed overnight or over weekend non-work periods.

Significance of Impacts After Mitigation

With the implementation of Mitigation measure WR-2a, impacts of Alternative 1 construction on surface or groundwater quality would be less than significant.

Impact WR-3: Alternative 1 construction would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

Construction of Alternative 1 would involve the installation of a diversion facility but not the earthen berms within the creekbed for the in-channel recharge basins. The lack of in-channel basins in this alternative reduces substantially the potential for alteration of the course of Amargosa Creek compared to the Proposed project. Nevertheless, if construction occurs in the stream channel during the rainy season, there is a potential for partially constructed facilities or equipment to be in the stream channel during a runoff event. These obstructions could alter the stream course and potentially cause flooding off-site. This impact is potentially significant.

Mitigation Measure

WR-3a: In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall cease prior to an expected imminent storm event. If a partially constructed berm is in place, it shall be removed if there is a chance it would alter the course of Amargosa Creek or result in off-site flooding. No equipment shall be left in the creek bed overnight or over the weekend non-work periods.

Significance of Impacts After Mitigation

With implementation of Mitigation Measure WR-3a, the impact on existing drainage patterns would be less than significant.

3.7.2.4.2 Operation Impacts

Alternative 1 operation involves periodic diversion of water from the California Aqueduct when water is available within existing allocations and the capture of excess stormwater flows from Amargosa Creek during the rainy season. However, the in-channel recharge basins would not be operated and, therefore, would not require in-channel maintenance activities.

Impact WR-1: Alternative 1 operation would potentially cause a substantial favorable change in groundwater availability and would not cause a substantial adverse change in surface water availability.

By retaining and recharging stormwater, the project could reduce the natural volume of surface water which flows down Amargosa Creek in some circumstances. However, Alternative 1 would not include the in-channel recharge basins and would therefore reduce the amount of in-channel flow downstream of the UAP to a lesser extent than the proposed project. The diversion of the Amargosa stormwater flows would be operated to not reduce the existing channel seepage downstream of the UAP. For the same reasons as the proposed project, Alternative 1 would have a less than significant impact on surface water availability.

All SWP project diversions would still be directed to the recharge basins. Therefore, the SWP water component of the recharge would continue to function providing about 18,000 acre feet per year of recharge on average. Therefore, Alternative 1 would cause a favorable change in groundwater availability and increase the availability of groundwater for withdrawal within the Antelope Valley Groundwater Basin, although to a lesser degree than the proposed project.

Mitigation Measures

WR-1a: In order to maintain the existing channel seepage for downstream overlying groundwater users, the streamflow shall be monitored at the POD to ensure sufficient flows past the POD to the meet the downstream channel seepage requirements.

Significance of Impacts after Mitigation

Impacts of the project on surface water availability would be less than significant.

Impacts of Alternative 1 operation on groundwater availability would be significant and favorable by virtue of adding an average of 18,000 acre feet per year to the groundwater basin.

Impact WR-2: Alternative 1 operation would not cause a substantial adverse change in surface water or groundwater quality.

For the same reasons as the proposed project, Alternative 1 would not adversely change surface or groundwater quality. Considering the routine testing and monitoring of SWP water, the substantial dilution that would occur within the aquifer, and the requirement for treatment prior to delivery to customers, the potential for Alternative 1 to contribute to an adverse change in groundwater quality is minimal and not considered significant.

Mitigation Measures

Provided withdrawn groundwater is treated prior to use for human consumption and tested according to all regulatory requirements, no mitigation is required.

Significance of Impacts After Mitigation

Impacts of Alternative 1 operation on groundwater quality would be less than significant.

Impact WR-3: Alternative 1 operation would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

Alternative 1 operation would not involve the periodic installation of earthen berms within the channel for the in-channel recharge basins. Therefore, there would be no need for reconstruction in preparation for the next runoff event. Therefore, this impact is less than significant.

Mitigation Measures

No mitigation is required.

Significance of Impacts After Mitigation

Impacts of Alternative 1 operation on drainage patterns would be less than significant.

3.7.2.5 Alternative 2 – Reduced Area of Off-Channel Recharge Basins

Alternative 2 would involve a smaller overall area of off-channel recharge basins. This would involve less construction, an expansion of the revegetation areas into the areas where basins would not be constructed, and a reduction in the recharge capacity of the facility.

3.7.2.5.1 Construction Impacts

Construction of Alternative 2 would involve the same in-channel disturbance as the proposed project since the in-channel basins would be constructed, but substantially less off-channel construction since the number of recharge basins would be cut in half compared to the Proposed project. Otherwise, construction of Alternative 1 would be the same as for the Proposed project

Impact WR-1: Alternative 2 construction would not cause a substantial adverse change in surface water or groundwater availability.

Construction of Alternative 2 would not involve activities that could cause a substantial adverse change in surface water or groundwater availability.

The impact would be less than significant.

Mitigation Measures

No mitigation is required.

Significance of Impacts After Mitigation

Impacts of Alternative 1 construction on surface or groundwater quality would be less than significant.

Impact WR-2: Alternative 2 construction would potentially cause a substantial adverse change in surface water or groundwater quality.

Construction for Alternative 2 would involve essentially the same in-channel activities as the proposed project. If construction occurs in the stream channel during the rainy season, there is a potential for equipment to be in the stream channel during a sudden runoff event. Should the equipment not be removed, there is the potential for leakage of fuel, fluids, or lubricants to enter the creek. The release of contaminants into the creek would be considered adverse and significant.

The impact would be potentially significant.

Mitigation Measures

WR-2a: In order to prevent equipment from releasing hazardous materials into the creek in sudden runoff events, construction of in-channel facilities shall not occur if an imminent storm event is expected. In-channel construction may resume once the channel dries sufficiently to support equipment. No equipment shall be left in the creek bed overnight or over weekend non-work periods.

Significance of Impacts After Mitigation

With the implementation of Mitigation measure WR-2a, impacts of Alternative 2 construction on surface or groundwater quality would be less than significant.

Impact WR-3: Alternative 2 construction would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

As for the proposed project, construction of Alternative 2 would involve the installation of a diversion facility and the construction of earthen berms within the creekbed for the in-channel recharge basins. Both of these

would involve altering to some extent the natural streamflow of Amargosa Creek. If construction occurs in the stream channel during the rainy season, there is a potential for partially constructed facilities or equipment to be in the stream channel during a runoff event. These obstructions could alter the stream course and potentially cause flooding off-site. This impact is potentially significant.

Mitigation Measure

WR-3a: In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall be confined to the dry season.

Significance of Impacts After Mitigation

With implementation of Mitigation Measure WR-3a, the impact of Alternative 2 on existing drainage patterns would be less than significant.

3.7.2.5.2 Operation Impacts

Alternative 2 operation involves periodic diversion of water from the California Aqueduct when water is available within existing allocations and the capture of excess stormwater flows from Amargosa Creek during the rainy season. However, while the in-channel recharge basins would be operated as described for the proposed project, fewer off-channel basins would be used.

Impact WR-1: Alternative 2 operation would potentially cause a substantial favorable change in groundwater availability and would not cause a substantial adverse change in surface water availability.

By retaining and recharging stormwater, the project could reduce the natural volume of surface water which flows down Amargosa Creek in some circumstances. However, Alternative 2 would not include approximately half of the off-channel recharge basins and would therefore reductions of in-channel flow downstream of the UAP would be to a lesser extent than those of the proposed project. The diversion of the Amargosa stormwater flows would be operated to not reduce the existing channel seepage downstream of the proposed project. For the same reasons as the proposed project, Alternative 2 would have a less than significant impact on surface water availability.

The total recharge from the project would be reduced substantially. SWP project diversions would still occur and be directed to the recharge basins. However, the limited recharge capacity would reduce the total recharge capacity compared to the proposed project to about 1***4***,000 acre feet per year of recharge on average. Therefore, Alternative 2 would cause a favorable change in groundwater availability and increase the availability of groundwater for withdrawal within the Antelope Valley Groundwater Basin, although to a much lesser degree than the proposed project.

Mitigation Measures

WR-1a: In order to maintain the existing channel seepage for downstream overlying groundwater users, the streamflow shall be monitored at the POD to ensure sufficient flows past the POD to the meet the downstream channel seepage requirements.

Significance of Impacts After Mitigation

Impacts of the project on surface water availability would be less than significant.

Impacts of Alternative 2 operation on groundwater availability would be significant and favorable by virtue of adding an average of 14,000 acre feet per year to the groundwater basin.

Impact WR-2: Alternative 2 operation would not cause a substantial adverse change in surface water or groundwater quality.

For the same reasons as the proposed project, Alternative 2 would not adversely change surface or groundwater quality. Considering the routine testing and monitoring of SWP water, the substantial dilution that would occur within the aquifer, and the requirement for treatment prior to delivery to customers, the potential for Alternative 1 to contribute to an adverse change in groundwater quality is minimal and not considered significant.

Mitigation Measures

Provided withdrawn groundwater is treated prior to use for human consumption and tested according to all regulatory requirements, no mitigation is required.

Significance of Impacts After Mitigation

Impacts of Alternative 2 operation on groundwater quality would be less than significant.

Impact WR-3: Alternative 2 operation would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

Alternative 2 operations would involve the periodic installation of earthen berms within the creekbed for the in-channel recharge basins, just as would occur in the proposed project. Two approximately three foot high earthen berms, made of streambed sediments, would be installed between the diversion facility and the 25th Street West Bridge. After storms, the berms in the channel would need to be reconstructed in preparation for the next runoff event. If reconstruction of berms occurs in the stream channel during the rainy season, there is a potential for partially constructed facilities or equipment to be in the stream channel during a sudden runoff event. These obstructions could alter the stream course. This impact is potentially significant.

Mitigation Measure

WR-3a: In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall cease prior to an expected imminent storm event. If a partially constructed berm is in place, it shall be removed if there is a chance it would alter the course of Amargosa Creek or result in off-site flooding. No equipment shall be left in the creek bed overnight or over the weekend non-work periods.

Significance of Impacts After Mitigation

With implementation of Mitigation Measure WR-3a, the impact of Alternative 2 on existing drainage patterns would be less than significant.

3.7.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

Alternative 3 involves all of the construction and operational aspects of the proposed project with the exception of the location of the diversion pipeline between the California Aqueduct and the diversion facility. Two alternative alignments are possible: one along the northern bank of Amargosa Creek that would be above

the creek level, sometimes cut into bedrock, and another along the creekbed itself which would be mostly in soft creekbed alluvium. The latter would be installed within the channel of Amargosa Creek to a depth sufficient to protect the pipe from damage during peak flows

3.7.2.6.1 Construction Impacts

Construction of Alternative 3 would be essentially the same as for the proposed project except for the alignment of the diversion pipeline. The construction schedule would be essentially the same, although the diversion pipeline length would be somewhat shorter for both alternative alignments.

Impact WR-1: Alternative 3 construction would not cause a substantial adverse change in surface water or groundwater availability.

As for the proposed project, construction will not involve activities that could cause a substantial adverse change in surface water or groundwater availability. The impact would be less than significant.

Mitigation Measures

No mitigation is required.

Significance of Impacts After Mitigation

Impacts of project construction on surface or groundwater quality would be less than significant.

Impact WR-2: Alternative 3 construction would potentially cause a substantial adverse change in surface water or groundwater quality.

As for the proposed project, if construction occurs in the stream channel during the rainy season, there is a potential for equipment to be in the stream channel during a sudden runoff event. Should the equipment not be removed, there is the potential for leakage of fuel, fluids, or lubricants to enter the creek. The release of contaminants into the creek would be considered adverse and significant.

The impact would be potentially significant.

Mitigation Measures

WR-2a: In order to prevent equipment from releasing hazardous materials into the creek in sudden runoff events, construction of in-channel facilities shall not occur if an imminent storm event is expected. In-channel construction may resume once the channel dries sufficiently to support equipment. No equipment shall be left in the creek bed overnight or over weekend non-work periods.

Significance of Impacts After Mitigation

With the implementation of Mitigation measure WR-2a, impacts of Alternative 3 construction on surface or groundwater quality would be less than significant.

Impact WR-3: Alternative 3 construction would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

As for the proposed project, construction would involve the installation of a diversion facility and the construction of earthen berms within the creekbed for the in-channel recharge basins. If construction occurs in

the stream channel during the rainy season, there is a potential for partially constructed facilities or equipment to be in the stream channel during a runoff event. These obstructions could alter the stream course and potentially cause flooding off-site. This impact is potentially significant.

Mitigation Measure

WR-3a: In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall cease prior to an expected imminent storm event. If a partially constructed berm is in place, it shall be removed if there is a chance it would alter the course of Amargosa Creek or result in off-site flooding. No equipment shall be left in the creek bed overnight or over the weekend non-work periods.

Significance of Impacts After Mitigation

With implementation of Mitigation Measure WR-3a, the impact of Alternative 3 on existing drainage patterns would be less than significant.

3.7.2.6.2 Operation Impacts

Alternative 3 operation is identical in all important respects to the Proposed project.

Impact WR-1: Alternative 3 operation would potentially cause a substantial favorable change in groundwater availability and would not cause a substantial adverse change in surface water availability.

Alternative 3 would cause a substantial favorable change in groundwater availability by virtue of its ability to readily capture water that otherwise would not recharge the groundwater basin and increase the availability of groundwater for withdrawal within the Antelope Valley Groundwater Basin.

By retaining and recharging stormwater, the project could reduce the natural volume of surface water which flows down Amargosa Creek in some circumstances. Alternative 3 operation is identical to the proposed project and therefore reductions of in-channel flow downstream of the UAP would be comparable to the proposed project. As in the proposed project, the diversion of the Amargosa stormwater flows would be operated to not reduce the existing channel seepage downstream of the UAP. For the same reasons as the proposed project, Alternative 2 would have a less than significant impact on surface water availability.

Mitigation Measures

WR-1a: In order to maintain the existing channel seepage for downstream overlying groundwater users, the streamflow shall be monitored at the POD to ensure sufficient flows past the POD to the meet the downstream channel seepage requirements.

Significance of Impacts After Mitigation

Impacts of the project on surface water availability would be less than significant.

Impacts of project operation on groundwater availability would be significant and favorable by virtue of adding an average of 24,000 acre feet per year to the groundwater basin.

Impact WR-2: Alternative 3 operation would not cause a substantial adverse change in surface water or groundwater quality.

Considering the routine testing and monitoring of SWP water, the substantial dilution that would occur within the aquifer, and the requirement for treatment prior to delivery to customers, the potential for Alternative 3 to contribute to an adverse change in groundwater quality is minimal and not considered significant.

Mitigation Measures

Provided withdrawn groundwater is treated prior to use for human consumption and tested according to all regulatory requirements, no mitigation is required.

Significance of Impacts After Mitigation

Impacts of Alternative 3 operation on groundwater quality would be less than significant.

Impact WR-3: Proposed project operation would potentially substantially alter existing drainage patterns, including alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in off-site flooding.

Alternative 3 operations would involve the periodic installation of earthen berms within the channel for the in-channel recharge basins. After storms, the berms in the channel would need to be reconstructed in preparation for the next runoff event. If reconstruction of berms occurs in the stream channel during the rainy season, there is a potential for partially constructed facilities or equipment to be in the stream channel during a sudden runoff event. These obstructions could alter the stream course. This impact is potentially significant.

Mitigation Measure

WR-3a: In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall cease prior to an expected imminent storm event. If a partially constructed berm is in place, it shall be removed if there is a chance it would alter the course of Amargosa Creek or result in off-site flooding. No equipment shall be left in the creek bed overnight or over the weekend non-work periods.

Significance of Impacts After Mitigation

With implementation of Mitigation Measure WR-3a, the impact on existing drainage patterns would be less than significant.

3.7.2.7 Alternative 4 – No Project

The No Project Alternative would not involve constructing or operating the UAP. The existing zoning would allow approximately 280 single family residences to be constructed on approximately 50 acres of the site. It is assumed that no construction would occur in the flood plain or stream channel. Therefore, most of the impacts associated with the proposed project that involve work in the streambed would not occur.

3.7.2.7.1 Construction Impacts

Given existing zoning, the No Project Alternative would involve the construction of approximately 280 residential units on lots of 7,000 square feet or greater on approximately 50 acres of the 87 acre site. This would involve installation of streets, utilities, and construction of houses on areas above the flood plain of

Amargosa Creek. Construction activities related to home building would be similar to those associated with the proposed project. Construction equipment would be required to grade and excavate pads for houses, foundations, utility trenches, roads and other facilities. The types of equipment would be comparable to those required for the proposed project and the physical areas involved in grading and excavation could be considerably larger. Overall, the No Project Alternative would likely result in somewhat greater surface water quality impacts than the proposed project. No impacts to groundwater resources would be expected.

3.7.2.7.2 Operation Impacts

With regard to operations, single family residences would result in more people in closer proximity to Amargosa Creek than the proposed project. Runoff from garden and lawn watering , motor vehicle fluids, car washing, pets, and other common household activities would occur. While potential channel diversion impacts would be avoided, there would be no beneficial enhanced recharge of the Antelope Valley Groundwater Basin. The existing inability of water agencies in the Antelope Valley to fully capture their State Water Project allotments would continue, thereby continuing to constrain their ability to meet demand during high water use periods when supply is insufficient. In general, the impacts to water quality would be adverse and greater than the proposed project, though probably not significant.

The inability to provide for demand would involve a significant adverse impact:

Impact WR-1: The No Project Alternative would potentially cause a substantial unfavorable change in surface water or groundwater availability.

The No Project Alternative would cause a substantial unfavorable change in groundwater availability through the continued depletion of the Antelope Valley Groundwater Basin.

3.7.3 Mitigation Measures and Monitoring Program

Table 3.7-7. Mitigation Monitoring Program

Mitigation Measure	*Responsible Party*	*Timing/Frequency*
Mitigation measure WR-1a: In order to maintain the existing channel seepage for downstream overlying groundwater users, the streamflow shall be monitored at the POD to ensure sufficient flows past the POD to the meet the downstream channel seepage requirements.	City of Palmdale	During Operation
Mitigation measure WR-2a: In order to prevent equipment from releasing hazardous materials into the creek in sudden runoff events, construction of in-channel facilities shall not occur if an imminent storm event is expected. In-channel construction may resume once the channel dries sufficiently to support equipment. No equipment shall be left in the creek bed overnight or over weekend non-work periods.	City of Palmdale	During Construction
Mitigation Measure WR-3a: In order to prevent equipment or partially constructed facilities from altering the course of the creek during a sudden runoff event, construction of in-channel facilities shall cease prior to an expected imminent storm event. If a partially constructed berm is in place, it shall be removed if there is a chance it would alter the course of Amargosa Creek or result in off-site flooding. No equipment shall be left in the creek bed overnight or over the weekend non-work periods.	City of Palmdale	During Construction

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3.8 Land Use

This section discusses existing uses adjacent to the proposed project site, and assesses the compatibility between the proposed project and existing and surrounding land uses.

3.8.1 Environmental Setting

3.8.1.1 Area of Influence

The Area of Influence for land use includes the proposed project site and extends to adjacent properties that would be assessed in terms of their compatibility with the project's functions on-site.

3.8.1.2 Setting

3.8.1.2.1 General Plan and Zoning Ordinance Designations

The 87-acre project site is located on the west side of the City of Palmdale within the City's urban boundary. The project site has a City General Plan land use designation of Single Family Residential-3 (SFR-3) (Figure 3.8-1). The SFR-3 designation is intended for single family residential uses with gross densities ranging from 3.1 to 6.0 dwellings per acre and an estimated population of 7,000 persons per square mile (City of Palmdale 1993).

The project site is currently zoned as Single Family Residential (R-1-7,000) (Figure 3.8-1). The R-1-7,000 designation is intended for single family residential with a 7,000 square foot minimum lot size (City of Palmdale, 1994).

3.8.1.2.2 Historical and On-site Land Uses

The project site is located on approximately 87 acres on four undeveloped parcels adjacent to Amargosa Creek. The project site is undeveloped; however portions of the area contain infrastructure from previous human use, including a sewer line with manhole covers, outflow from stormwater culverts, the Elizabeth Lake Road embankment, the 25th Street West bridge spanning Amargosa Creek, a small concrete apron in the creek channel, and unimproved roads and pathways.

3.8.1.2.3 Surrounding Land Uses

The project site is located adjacent to Amargosa Creek and north of Elizabeth Lake Road, and extends approximately 3,000 feet from the planned 20th Street West Bridge to the existing 25th Street West Bridge, and approximately 2,700 feet west to near the Leona Siphon of the California Aqueduct (Figure 2-2). Residential uses to the north and east of the project site are designated as Single Family Residential-3. Areas to the west of the project area are designated for Low Density Residential (LDR) land uses (Figure 3.8-1). Low Density Residential is defined by the General Plan as single family residential uses with a gross density of one dwelling per unit acre and estimated population of 1,600 per square mile (City of Palmdale 1993). Areas south of the project site are within the City Ranch Specific Plan Area (Figure 3.8-1).

3.8.1.3 Regulatory Setting

3.8.1.3.1 City of Palmdale General Plan-Land Use Element

The City of Palmdale General Plan is a comprehensive, long-term plan for protection of the City's resources and for the physical development of the City. The City of Palmdale General Plan contains goals, objectives,

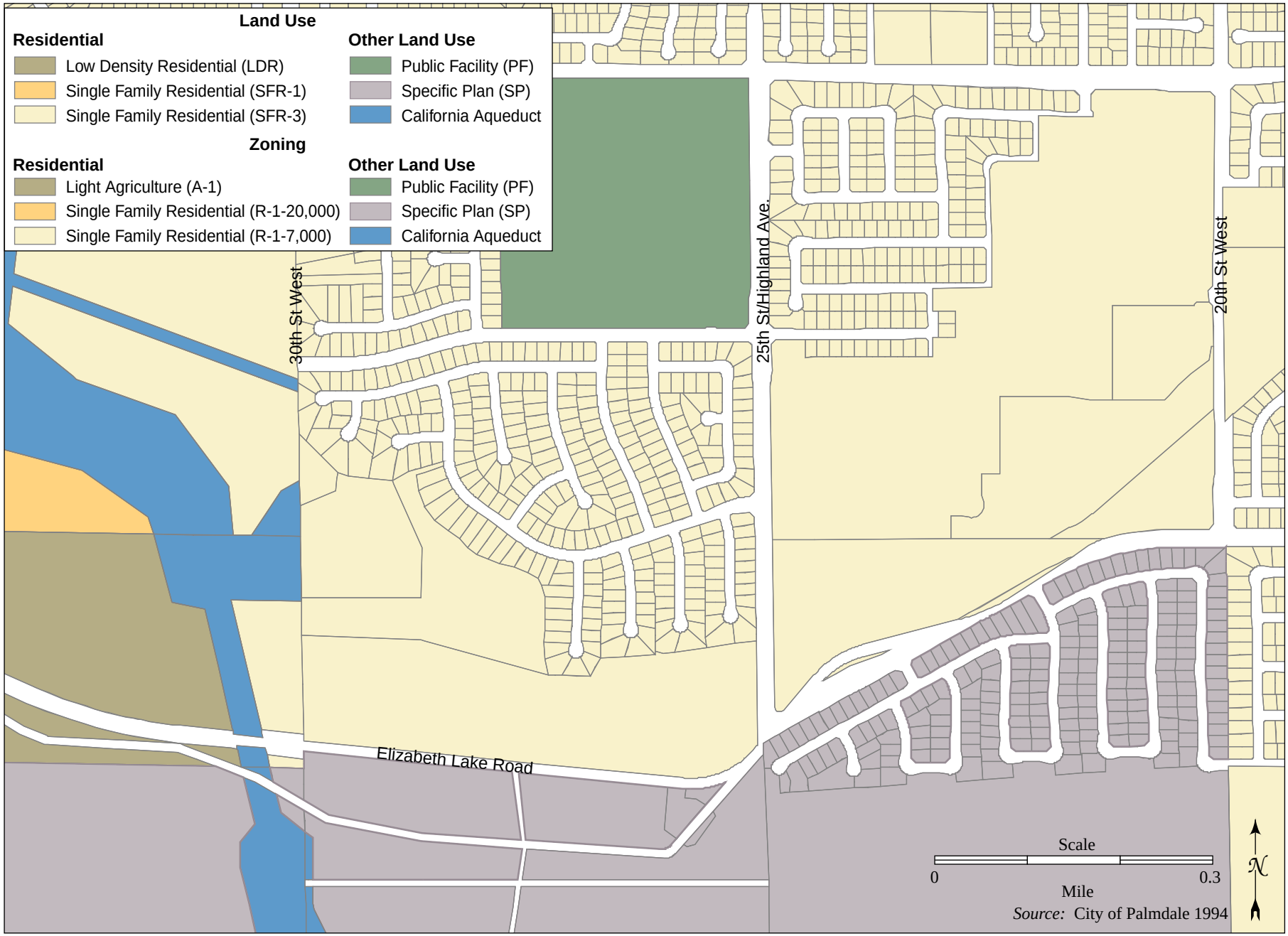

Figure 3.8-1. Land Use and Zoning Map

policies, and programs that support the City's vision announced in the plan. The General Plan was developed pursuant to Section 65300 *et seq*. of the California Government Code, requiring planning jurisdictions to prepare and adopt a comprehensive, long-term general plan for the physical development of the City, consisting of a statement of development policies and guidelines setting forth objectives, principles, standards and plan proposals (City of Palmdale 1993). The City's General Plan includes the following Citywide Elements: Circulation; Environmental Resources; Public Services; Safety; Noise; Housing; Parks, Recreation, and Trails; and Community Design.

3.8.1.3.2 City of Palmdale Zoning Code

Building Number U-1060 serves as the City's Zoning Ordinance. The City's zoning ordinance is the City's principal tool for the implementing the goals, objectives and policies of the City of Palmdale General Plan. The City's zoning ordinance identifies permitted uses and applicable development standards such as lot size, heights, parking, landscaping requirements, within each zoning designation. State law requires that zoning maps be consistent with their jurisdiction's general plan land use map.

3.8.2 Impacts and Mitigation Measures

3.8.2.1 Methodology

This analysis evaluates consistency or compliance of the proposed project with adopted plans and policies governing land use development on the project site, including the City of Palmdale General Plan and its Elements, the Zoning Ordinance, and other applicable plans.

The land use analysis also evaluates the potential for the proposed project to introduce incompatible land uses relative to existing surrounding land uses or activities. This analysis includes an evaluation of the extent to which off-site land uses would be affected by project-related physical interruption or disruption, or the extent to which other project-related environmental impacts would constitute land use impacts.

3.8.2.2 Significance Criteria

Consistent with CEQA Guidelines *Appendix G* Environmental Checklist Form, the proposed project would have a significant impact on land use if it would result in one or more of the following conditions:

LU-1: Create structures and/or land uses incompatible with existing or adjacent land uses; or

LU-2: Conflict with any goals, objectives, and/or policies of applicable land use plans.

3.8.2.3 Proposed Project

Impact LU-1: The project would not create structures and/or land uses incompatible with existing or adjacent land uses.

The project site and surrounding areas are currently designated for residential uses. The project site would ultimately be re-zoned from Single Family Residential to Public Facilities and the land use designation would change from Single Family Residential to Public Facility to accommodate the proposed uses of the project site. The General Plan Goal L1 envisions the creation of long-term growth and development in the City that provides for orderly, functional patterns of land uses within the urban areas, a unified and coherent urban form, and a high quality of life for its residents. Under this goal, Objective L1.3 requires the City to ensure compatibility between land uses which have different functions, requirements, and impacts. The project is consistent with the permitted public facility land use identified in the City of Palmdale Zoning Ordinance

Chapter 7, Article 71 including natural areas; open space areas; biological preserves; riding, hiking, and bicycle trails and appurtenant facilities; nature interpretive centers; and water impoundment and groundwater recharge (City of Palmdale 1994).

Additionally, the zoning ordinance indicates that public facility zones may be designated throughout the City's planning area, provided the use does not conflict with other established uses. Land uses associated with the proposed project would be compatible with surrounding residential land uses in the area. As the proposed project would provide natural areas, open space, and recreational opportunities, no incompatibilities with the surrounding residential land uses would result. Thus, impacts would be less than significant.

Mitigation Measures

As impacts on existing or adjacent land uses would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on existing or adjacent land uses would be less than significant.

Impact LU-2: The project would not conflict with any goals, objectives, and/or policies of applicable land use plans.

The proposed project site is located within the City limits. However, a General Plan amendment and zone change would be required to support the development of the proposed facilities within the project site. The proposed project would be consistent with the locational criteria and permitted uses for Public Facilities stipulated in the Zoning Ordinance Chapter 7 Article 71 (City of Palmdale 1994). Additionally, construction of the proposed recharge facility, nature park, native habitat conservation area, and open stream channel would be consistent with General Plan policies associated with the creation of long-term growth and development in the City that provides a balanced set of land uses that provide a high quality of life for its residents. Specifically, Objective L1.4 stipulates that the City adopt land use policies that minimize exposure of residents to natural hazards, protect natural resources, and utilize land with limited development potential for open space and recreational uses where feasible. The proposed project would provide protection of natural resources through increased groundwater recharge to the Antelope Valley Groundwater Basin. Therefore, impacts on land use policies related to balanced land use within the City would be less than significant.

General Plan Goal L6 stipulates that the City shall plan for and reserve land to accommodate uses needed for public benefit, including open space, recreation, public improvements, schools, and community facilities. Additionally, Objective 6.1 specifies that adequate land be available for uses serving or providing benefit to the general public including public facilities. Objective L6.2 requires the City to adopt development standards for public uses to ensure compatibility with adjacent properties to minimize adverse impacts and maintain a high standard of quality for development within the City. The project would utilize land with limited development potential to create open space and recreational opportunities, including multi-use pathways and passive recreational amenities, that would serve existing, proposed, and recently developed residential uses in the immediate area. . Therefore, impacts on land use policies related to accommodating land uses needed for public benefit within the City would be less than significant.

With the City's approval of a General Plan Amendments, a zone change of the project site, and approval of a Site Plan Review application, a less than significant impact would occur.

Mitigation Measures

As impacts on land use would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on land use would be less than significant.

3.8.2.4 Alternative 1 –No In-Channel Recharge Basin

The No In-Channel Recharge Basin Alternative would involve the same construction and operation of facilities as the proposed project with the exception of the in-channel recharge basins. This alternative would not alter the size of the nature park or pipeline lengths or alignments. Similar to the proposed project, the No In-Channel Recharge Basin Alternative would be compatible with the existing character of the project site and the surrounding land uses. Additionally, this alternative would be consistent with the goals, objectives, and/or policies of applicable land use plans. As such, implementation of the No In-Channel Recharge Basin Alternative would result in less than significant impacts on land use. Therefore, the No In-Channel Recharge Basin would be equivalent to the proposed project relative to land use.

3.8.2.5 Alternative 2 – Reduced Off-Channel Recharge Basin

The Reduced Off-Channel Recharge Basin Alternative would eliminate three off-channel basins located on in approximately 10 acres in the eastern portion of the project site. This area would instead become part of the Nature Park. Additionally, under this alternative the Collector Pipeline would decrease in length as compared to the proposed project and would not run through the proposed nature park Heritage Habitat. This alternative would involve the same construction and operation of facilities as the proposed project with the exception of those items discussed above. Similar to the proposed project, the Reduced Off-Channel Recharge Basin Alternative would be compatible with the existing character of the project site and the surrounding land uses. Additionally, this alternative would be consistent with the goals, objectives, and/or policies of applicable land use plans.

3.8.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

The Alternative Aqueduct Diversion Pipeline Alignments Alternative would change the location and shorten the length of the aqueduct diversion pipeline. This alternative would involve the same construction and operation of facilities as the proposed project; however construction would occur over a shorter distance because of the reduced pipeline length. Similar to the proposed project, the Alternative Aqueduct Diversion Pipeline Alternative would be compatible with the existing character of the project site and the surrounding land uses. Additionally, this alternative would be consistent with the goals, objectives, and/or policies of applicable land use plans.

3.8.2.7 Alternative 4- No Project Alternative

The No Project Alternative would involve construction of approximately 280 housing units on approximately 50 acres of the project site consistent with current zoning of the project property. Housing would not be constructed in the flood plain of the creek and low-lying areas would remain as open space. However, to protect housing, it may be deemed necessary to construct protective embankments within the creek channel to prevent erosion from encroaching on houses.

Overall, the No Project Alternative would be consistent with current adjacent land uses and would not conflict with current zoning or land use plan goals, objectives, and policies. Land Use impacts would therefore be less than significant.

3.8.3 Mitigation Measures and Monitoring Program

As no mitigation measures are required to address impacts on land use, no mitigation monitoring program is required.

3.9 Noise

Noise is defined as any unwanted sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. This section addresses the existing noise levels in the vicinity of the project site, those changes that would result from the proposed project, and potential land use conflicts.

3.9.1 Environmental Setting

3.9.1.1 Noise Characteristics

Sound results from pressure variations in air that the human ear can detect. The nature of sound can be characterized by its pitch or its loudness. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. Loudness is the amplitude of sound waves combined with the reception characteristics of the ear. Technical acoustical terms commonly used in this section are defined in Table 3.9-1.

Table 3.9-1. Definitions of Acoustical Terms

Term	*Definition*
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for sound in air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or micro Newtons per square meter), where one Pascal is the pressure resulting from a force of one Newton exerted over an area of one square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals in air). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level during the measurement period. The hourly L_{eq} used for this report is denoted as dBA $L_{eq[h]}$.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

3.9.1.1.1 Sound Level and Frequency

There are several noise measurement scales which are used to describe noise. The decibel (dB) is a unit of measurement which indicates the relative amplitude of a sound. Zero on the decibel scale is based on the lowest sound pressure that a healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a 10-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its level. Each 10-decibel increase in sound level is perceived as approximately a doubling of loudness over a wide range of amplitudes. Since decibels are logarithmic units, sound pressure levels are not added arithmetically. When two sounds of equal sound pressure level are added, the result is a sound pressure level that is three dB higher. For example, if the

sound level were 70 dB when 100 cars pass by in a certain time period, then it would be 73 dB if 200 cars pass the observer during the same period. Doubling the amount of energy would result in a three dB increase to the sound level.

Frequency relates to the number of pressure oscillations or cycles per second, known as Hertz (Hz). The range of sound frequencies that can be heard by healthy human ears is from about 20 Hz at the low end of the frequency spectrum to 20,000 Hz at the high end.

There are several methods for characterizing sound. The most common is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Studies have shown that the A-weighted level is closely correlated with annoyance caused by noise sources such as traffic and construction activity. Table 3.9-2 shows typical A-weighted sound levels that occur in various indoor and outdoor environments.

Table 3.9-2. Typical Noise Levels in the Environment

Common Outdoor Noise Source	*Noise Level (dBA)*	*Common Indoor Noise Source*
	120	
Jet fly-over at 1,000 feet ——		
	110	—— Rock concert
	100	
Pile driver at 100 feet ——		—— Night club with live music
	90	
Large truck passby at 50 feet ——		
	80	—— Noisy restaurant
Gas lawn mower at 50 feet ——		
	70	—— Vacuum cleaner at 10 feet
Commercial/Urban area daytime ——		—— Normal speech at 3 feet
	60	
Suburban daytime ——		—— Active office environment
	50	
Urban area nighttime ——		—— Quiet office environment
	40	
Suburban nighttime ——		
Quiet rural areas ——	30	—— Library
		—— Quiet bedroom at night
Wilderness area ——	20	
	10	—— Quiet recording studio
Threshold of human hearing ——	0	—— Threshold of human hearing

Source: Adapted from CalTrans 2008 in Noise Study Report Format Guidance Document

Noise Descriptors

Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations is utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. A common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

Human Response to Noise

It is widely accepted that sound pressure level changes of 3 dBA are considered just noticeable to most people. A change of 5 dBA is readily perceptible. An increase in sound pressure level of 10 dBA is perceived as being twice as loud while a decrease of 10 dBA is perceived as being half as loud.

3.9.1.1.2 Sound Propagation

When sound propagates over a distance, it changes in both level and frequency content. The manner in which noise is reduced with distance depends on several factors:

Geometric Spreading

Sound from a single source (i.e., a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates (or drops off) at a rate of six dBA (one quarter the acoustic energy) for each doubling of distance. When the source is linear, like a highway, it does not behave as a single stationary point source of sound. The movement of vehicles on a highway makes the source of the sound to appear to emanate from a line (i.e., a "line" source) rather than from a point. This results in cylindrical spreading rather than the spherical spreading resulting from a point source. The change in sound level from a line source is three dBA (one half the acoustic energy) per doubling of distance.

Ground Absorption

Often, the noise path between the source and the observer is very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation because of geometric spreading. For the purpose of this analysis, no ground absorption is considered making the analysis more conservative.

Atmospheric Effects

Research by Caltrans and others has shown that atmospheric conditions can have a major effect on noise levels. Wind has been shown to be the single most important meteorological factor within approximately 150 meters (500 feet), whereas vertical air temperature gradients are more important over longer distances. Other factors, such as air temperature, humidity, and turbulence, also have an effect. However, for this analysis, no attenuation from atmospheric effects is considered.

Shielding

A large object or barrier, whether natural or man-made, in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by this shielding depends on the size of the object and the frequency content of the noise source. Natural terrain and man-made buildings and walls can often serve as effective noise barriers. Vegetation provides only very limited attenuation. Given the flat topography of the site, no shielding from natural or man-made features is assumed.

3.9.1.2 Area of Influence

The Area of Influence for this noise analysis includes those sensitive receptors closest to the project site that may be affected by construction noise or noise associated with additional street traffic generated by the project.

3.9.1.3 Setting

The project site is located on the southwestern edge of existing urban development within the City of Palmdale. The site is surrounded by existing or planned residential development, including the planned community of City Ranch to the south. The primary noise source currently affecting the project area is transportation noise from vehicles traveling Elizabeth Lake Road and 25th Street West/Highland Avenue and military aircraft noise from aircraft operations associated with Plant 42 (USAF Plant 42) located east of the Sierra Highway and north of Avenue P. Other sources of ambient noise in the project vicinity are those typically associated with residential areas including power mowers, leaf blowers, chain saws, air conditioners, swimming pool filters, animals, and children.

The project site is located approximately three miles west of the USAF Plant 42. The project site and surrounding areas do not fall within the Frequent Overflight Area of USAF Plant 42, which is defined by Avenue K-4 to the north, Avenue Q-4 to the south, 85th Street East to the east, and the Sierra Highway to the west. However, overflights are audible at the project site.

3.9.1.3.1 Sensitive Receptors

Noise sensitive land uses include residential (single and multi-family dwellings, mobile home parks, dormitories); transient lodging (including hotels and motels); hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care; public or private educational facilities, libraries, churches, and places of public assembly (City of Palmdale 1993).

Sensitive receptors in the vicinity of the proposed project area are comprised of residential land uses. The City of Palmdale considers residential areas to be a noise-sensitive land use (City of Palmdale 1993). The General Plan indicates that residential uses are one of the most noise-sensitive land uses because the residents have an expectation that their daily lives will not be exposed to excessive noise levels that interfere with normal residential activities, such as family conversations, entertaining, telephone use, watching television, and the ability to sleep uninterrupted by outside noise sources. Residential uses are also affected by long-term exposure to a localized noise environment that can cause a cumulative level of annoyance among the residents because their continued exposure to the noise source(s) interferes with their normal expectations regarding an appropriate residential environment.

Three sensitive receptor sites were selected to represent sensitive uses closest to the project site, as indicated in Figure 3.9-1 and Table 3.9-3. These locations represent public areas with the potential to experience increased noise from project construction or operation.

Table 3.9-3. Noise-Sensitive Receptors

Receptor	***Location***	***Land Use***
Receptor A: Residential Area northwest of 25th Street West Bridge	The property line adjacent to 25th Street West/Highland Avenue west of the bridge and north of the project site.	Residential
Receptor B: Residential Area South of 25th Street West Bridge and Elizabeth Lake Road	The property line adjacent to Elizabeth Lake Road south of the 25th Street West Bridge south of the project site.	Residential
Receptor C: Residential Area Northeast of 25th Street West Bridge and Elizabeth Lake Road	The property line of the residential area adjacent to 25th Street West/Highland Avenue east of the bridge and north of the project site.	Residential

Figure 3.9-1. Location of Noise Sensitive Receptors

3.9.1.3.2 Existing Noise Environment

A site specific, baseline noise survey was not conducted for the proposed project. A community noise survey was conducted in 1987 to document the existing noise environment within the City of Palmdale. Noise measurements were taken at 12 locations representing residential, commercial, industrial, public use areas, and undeveloped property. The General Plan indicates that these noise measurement results should be used as a guide or indication of noise levels throughout the community.

Measurements representing residential locations were taken at two locations comparable to the project area. The Table 3.9-4 shows the L50 values (meaning the sound level exceeded 50 percent of the time over the noise measurement duration) and the L90 values (the level exceeded 90 percent of the noise measurement duration, also considered to represent the background or ambient level) measures at these two locations. The L50 values ranged from 51.0 to 55.5 dBA and L90 values ranging from 49.0 to 51.0 dBA (Table 3.9-4).

Table 3.9-4. Existing Noise Level at Residential Sites Comparable to the Proposed Project (dBA)

Monitoring Site[1]	*Monitored L50*[2]	*Monitored L90*[3]	*Major Noise Source*
Site 7	55.5	45.5	Roadway traffic at slow speeds;
Site 12	51.0	49.0	Roadway traffic at slow speeds; Site located away from major noise sources

Source: City of Palmdale General Plan, Noise Element (City of Palmdale 1993)
Notes:
1. The Monitoring Sites in this table correspond to those presented in Table N-4 of the City of Palmdale General Plan, Noise Element.
2. L50 is the sound level exceeded for 50 percent of the time over the duration of a measurement.
3. L90 is the sound level exceeded for 90 percent of the time over the duration of a measurement. It is commonly termed the background noise level.

Measurements at the four residential locations included noise from roadway traffic at slower speeds and two sites included traffic noise along State Route 14 and military aircraft flyover noise. These noise conditions are assumed to be representative of the existing conditions within the proposed project site and residential areas surrounding the proposed project. Based on Table 3.9-4, ambient levels in the project vicinity are expected to be at or below 50 dB. Therefore, the baseline level is considered to be 50 dB.

3.9.1.4 Regulatory Setting

3.9.1.4.1 Federal

Federal Highway Administration (FHWA) Noise Standards

The FHWA has adopted noise standards, regulations, and policies related to traffic noise. The federal regulations addressing highway noise are defined in 23 CFR Part 772. These standards are not directly applicable to the proposed action because it is not a Type 1 federally funded highway improvement project. However, the FHWA includes in its guidance a methodology to evaluate construction noise impacts. This methodology, included in the FHWA's Roadway Construction Noise Model User's Guide, has been incorporated into this section to evaluate construction noise impacts (FHWA 2006).

3.9.1.4.2 Local

City of Palmdale General Plan-Noise Element

The City of Palmdale General Plan Noise Element identifies the 60 and 65 dBA CNEL noise contour for transportation noise sources including the Antelope Valley Freeway (SR-14), Pearblossom Highway, two

Southern Pacific Railroad Lines (the Valley Mainline and the Colton/Palmdale Cutoff), USAF Plant 42, and major roadways (City of Palmdale 1993). The project site and surrounding areas falls just outside and to the west of the 60 dBA CNEL contour for existing transportation noise as defined by the General Plan. According to the City of Palmdale General Plan Noise Element, the standard relevant to the project and surrounding noise-sensitive land uses would be less than 65 dBA CNEL for exterior noise levels and 45 dBA CNEL or less for interior noise levels (City of Palmdale 1993).

City of Palmdale Municipal Code

The City of Palmdale Municipal Code (Chapter 8.28) contains provisions that restrict construction activity for a project site and within 500 feet of surrounding residential zones to the hours of 6:30 A.M to 8:00 P.M., Monday through Saturday. The code defines construction activities as "work of any kind upon any building or structure, earth excavating, filling, or moving, and delivery, preparation or operation of construction equipment, materials or supplies where any of the foregoing entail the use of an air compressor, jack hammer, power-driven drill, riveting machine, excavator, semi-truck, diesel power truck, tractor, cement truck, or earth moving equipment, hand hammer, or other machine, tool, device or equipment which makes loud noise which disturbs the please and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness sleeping or residing in the area" (City of Palmdale 1993).

3.9.2 Impacts and Mitigation Measures

3.9.2.1 Methodology

Determining the significance of noise impacts resulting from the proposed action and alternatives involved four main tasks: (1) Sensitive receptor sites were selected to characterize public and other noise sensitive uses in the study area; (2) Assumptions concerning the existing baseline noise levels at the selected receptor sites were made; (3) Noise data from a selection of the proposed construction equipment that could be operating simultaneously was assembled (Table 3.9-5) and extrapolated from published sources and used to estimate the demolition/construction noise impact.

Table 3.9-5. Estimated Demolition Equipment Noise Levels

Equipment	*Estimated Noise Level (dB) at 50-feet*
Air compressor	81
Backhoe	80
Compactor	82
Crane, mobile	83
Dozer	85
Generator	81
Grader	85
Jack Hammer	88
Loader	85
Pump	76
Rock Drill	98
Scraper	89
Truck (heavy)	88
Welder	73
Source: FHWA 2006. Roadway Construction Noise Model User's Guide, Federal Highway Administration, Final Report, January 2006	

Noise impacts are based on estimates of the audible increment of noise above a background level. This involves a comparison of measured or estimated noise levels with and without the source in question for a

given time period. Given the nature of the project, the primary source of noise will be construction. Noise associated with operation would be minimal involving only periodic maintenance of facility features. Since construction will not be a 24-hour activity, hourly Leq levels are used in the calculation of estimated noise levels. Also, while the City's Noise Element uses CNEL (community noise equivalent level) to describe thresholds, this analysis uses daytime hourly averages to calculate impacts. These averages are compared to the CNEL standard on the basis that the CNEL represents a weighted 24 hour average that is comparable to a daytime one-hour average.

In general, ambient noise levels depend on noise generating activities occurring within a relatively limited geographic area. To the extent those activities do not change substantially over time, the ambient noise in the area will remain relatively constant as will the noise baseline. In addition, because a doubling of the sound pressure level is necessary to result in minimally audible 3 dB increase in noise, substantial changes in activity can occur without causing readily detectable increases in noise level.

3.9.2.2 Significance Criteria

Consistent with the City's Noise Element standards, the proposed project would have a significant impact on noise if it would result in one or more of the following conditions:

NOISE-1: Generate short-term noise levels exceeding 65 dBA that could affect sensitive receptors;

NOISE-2: Generate long-term exterior noise levels exceeding 65 dBA and/or interior noise levels exceeding 45 dBA that could affect sensitive receptors; or

NOISE-3: Substantially increase the existing noise levels of adjacent areas.

The following CEQA Guidelines Appendix G Environmental Checklist Form, criteria are not used here because the proposed project is not affected by the conditions and would not result in the exceedance of the threshold criteria:

- For a project located within an airport land use plan or ,where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would expose people residing or working in the project area to excessive noise levels.
  - *The proposed project is not located within an airport land use plan or within two miles of a public airport or public use airport.*
- For a project located within the vicinity of a private airstrip, the project would expose people residing or working in the project area to excessive noise levels.
  - *The proposed project is not located in the vicinity of a private airstrip.*
- The project would result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
  - *The proposed project would not produce long-term groundborn vibrations or noise.*

3.9.2.3 Proposed Project

Impact NOISE-1: The project would generate short-term noise levels exceeding 65 dBA that could affect sensitive receptors during construction.

Noise levels in the immediate vicinity of construction areas would be associated with construction of the pipeline and the in-channel and off-channel recharge basins. These are the three main construction activities

associated with the proposed project (Figure 3.9-1). The intensity of potential noise impacts depends upon the proximity of the noise receptor to the area under construction, the number and types of construction equipment operating in that area, and the length of time each item of equipment is in use.

Construction activities associated with the proposed project would be limited to the hours of 6:30 A.M to 8:00 P.M., Monday through Saturday in accordance with the City of Palmdale Municipal Code. During construction of the proposed project, overall noise would be determined by the combined noise contributions from the various items of equipment in use at a given time. The combined noise levels of multiple sources are typically dominated by the two loudest sources which are identified in the calculations in Appendix D. Hourly average L_{eq} noise levels were estimated for the project based on the types and numbers of equipment anticipated to be on site for each stage of the construction process.

The noise impact analysis for construction is based on the approximate distances between each sensitive receptor site and the construction sites. The distances between each sensitive receptor and noise sources, along with estimated noise levels with and without natural attenuation, is provided in Table 3.9-6. The ambient noise level assumed for each residential location is 50 dBA, a typical level for residential neighborhoods and consistent with Palmdale General Plan levels.

Table 3.9-6. Noise-Sensitive Receptors

Receptor Site	*Source Site*	*Ambient Receptor Level (Est)*	*Distance Between Source and Receptor (feet)*	*Calculated Source Noise Level (dBA, Leq-1 hour)*	*Unattenutated Impact Level at Receptor*	*Natural Attenuation due to intervening Structures (dBA)*	*Attenuated Impact Level at Receptor*
Receptor Site A: Residential Area Northwest of 25th Street West Bridge	Pipeline	50	100	81	75	10	65
	In-Channel Basins	50	250	82	68	10	58
	Off-Channel Basins	50	350	82	65	10	55
Receptor Site B: Residential Area South of 25th Street West Bridge and Elizabeth Lake Road	Pipeline	50	475	81	62	5	57
	Off-Channel Basins	50	500	82	63	5	58
	In-Channel Basins	50	300	82	63	5	58
Receptor Site C: Residential Area Northeast of 25th Street West Bridge and Elizabeth Lake	Pipeline	50	500	81	62	0	62
	In-Channel Basins	50	600	82	61	0	61
	Off-Channel Basins	50	2000	82	53	0	53

Note:
All measurements or estimates are one-hour Leq levels.
All noise levels rounded to nearest dbA

Estimated hourly construction noise at each of the selected sensitive receptor sites is provided in Appendix D and summarized in Table 3.9-6. Reported noise levels are 1-hour Leq values.

Receptor Site A: Residential Area Northwest of 25th Street West Bridge

Receptor site A is closest to all project construction activity. The existing sound walls on the property boundary between the project site and these residential lots would attenuate equipment noise by

approximately 10 dB. (A 10 dBA reduction requires reducing the acoustic energy by 90 percent. and is considered attainable with the existing sound wall. Higher reductions are very difficult to achieve [FHWA 1995]). The estimated noise impact level would therefore be 65 dBA when the pipeline construction was nearest the houses, which would only occur for a limited period of less than one week. While this level equals the threshold criterion, it does not exceed it and would only occur over a very limited period of project construction. The impact is considered less than significant.

Receptor Site B: Residential Area South of 25th Street West Bridge and Elizabeth Lake Road

Residences near Site B are farther from the project construction activities than those at Site A. The existing vegetation barrier on the property boundary between the project site and these residential lots south of the project site, as well as the difference in topography, would attenuate equipment noise by approximately 5 dB. Impacts experienced at Site B would be less than significant with or without the assumed 5 dBA attenuation provided by topography and vegetation and the impact is considered less than significant.

Receptor Site C: Residential Area Northeast of 25th Street West Bridge and Elizabeth Lake

Receptor Site C is nearer to construction than Site Band consists of houses under construction at this time. It is assumed that fencing would be constructed between the houses and the construction location prior to the commencement of UAP construction. However, no natural attenuation is assumed in the analysis. Short-term noise associated with construction of the proposed project would not exceed 65 dBA at this receptor site and thus would result less than significant noise impacts.

The noise impacts of project construction would be short term. The peak noise is estimated to be just at the threshold of 65 dBA at the nearest residences to pipeline construction. However, these levels would occur for a very limited time period estimated to be less than a week in duration when the pipeline is being laid immediately adjacent to the residential community. Therefore, the noise impacts of construction activities are considered adverse, but less than significant.

During construction there would be workers at the construction site as well as trucks bringing supplies and equipment. The construction worker based vehicle trips for construction represents a small fraction of the AM and PM peak hour traffic volumes in the project area and would not result in a noticeable increase in noise levels. Therefore, traffic generated noise from construction work trips would be considered a less than significant impact.

Mitigation Measures

Since noise impacts of construction are considered to be less than significant, no mitigation is required. However, the following measures represent practical methods to ensure that noise impacts are minimized and should be implemented to keep noise levels below the threshold.

Mitigation Measure Noise-1.1: Construction Equipment. Construction equipment powered by internal combustion engines shall be properly muffled and maintained.

Mitigation Measure Noise-1.2: Idling Prohibitions. Unnecessary idling of internal combustion engines near noise-sensitive areas shall be prohibited.

Mitigation Measure Noise-1.3: Equipment Location. Stationary noise-generating construction equipment, such as air compressors and portable power generators, shall be located as far as practical from existing noise-sensitive land uses.

Significance of Impacts after Mitigation

Since noise impacts of construction are considered less than significant, no mitigation is required. However, the above measures would serve ensure that noise at sensitive receptors does not exceed threshold levels.

Impact NOISE-2: The proposed project would not generate long-term exterior noise levels exceeding 65 dBA and/or interior noise levels exceeding 45 dBA that could affect sensitive receptors; or

Operation noise sources associated with the proposed project would include the intermittent sounds of the movement of approximately one vehicle per day entering and exiting the project site; pumps associated with the diversion from the California Aqueduct; water flowing through the intake structures; and voices of visitors to the Nature Park. Noise associated with the one to two backhoes or skip loaders for annual maintenance the retention basins (removal of silt and weeds) would occur on an intermittent basis. The dominant sources of noise at the project site would be the noise associated with visitors to the Nature Park, adjacent traffic, and natural sounds of wind and water movement, all of which would occur on an intermittent basis. No long-term traffic resulting in noise generation on adjacent roadways would occur.

Given the minimal noise associated with operation of the proposed project, long-term exterior noise levels at sensitive receptor sites are not expected to exceed 65 dBA or interior noise levels of 45 dBA. Thus, operation of the proposed project would result in less than significant noise impacts.

Mitigation Measures

As impacts on acceptable long-term noise levels would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on long-term noise levels would be less than significant.

Impact NOISE-3: The proposed project would not substantially increase the existing noise levels of adjacent areas.

Existing ambient noise levels within the project site are influenced by activities associated with undeveloped land, but are subject to a variety of surrounding urban disturbances mainly traffic-related noise. Operation of the proposed project would not result in a perceptible increase in ambient noise levels in the project vicinity. Accordingly, existing residences adjacent to the site boundary would not experience substantial increases in ambient noise levels. Therefore, the change in ambient noise levels from undeveloped property to public facilities and open space would be less than significant.

Mitigation Measures

As impacts on noise would be less than significant, no mitigation is required.

Significance of Impacts after Mitigation

Impacts on noise levels would be less than significant.

3.9.2.4 Alternative 1 –No In-Channel Recharge Basin

The No In-Channel Recharge Basin Alternative would involve the same construction and operation of facilities as with the exception of the in-channel recharge basins. This alternative would not alter the size of the nature park or pipeline lengths or alignments. Similar to the proposed project, the No In-Channel

Recharge Basin Alternative would result in less than significant short-term noise impacts due to construction. However, this alternative would eliminate short-term noise impacts associated with construction of the in-channel basins. Based on the above, noise impacts associated with the No In-Channel Recharge Basin would be less than those resulting from the proposed project.

3.9.2.5 Alternative 2 – Reduced Off-Channel Recharge Basin

The Reduced Off-Channel Recharge Basin Alternative would eliminate three off-channel basins located on approximately 10 acres in the eastern portion of the project site. This area would instead become part of the Nature Park. Additionally, under this alternative the Collector Pipeline would be shorter as compared to the proposed project. This alternative would involve the same construction and operation of facilities as the proposed project with the exception of those items discussed above, thereby somewhat shortening the construction period. Similar to the proposed project, the Reduced Off-Channel Recharge Basin Alternative would result in less than significant short-term noise impacts. However, this alternative would eliminate short-term noise associated with construction of the off-channel recharge basins. As such, implementation of the Reduced Off-Channel Recharge Basin Alternative would not result in significant impacts on noise. Based on the above, noise impacts associated with the Reduced Off-Channel Recharge Basin would be less than those resulting from the proposed project.

3.9.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

The Alternative Aqueduct Diversion Pipeline Alignments Alternative would change the location and shorten the length of the aqueduct diversion pipeline. This alternative would involve the same construction and operation of facilities as the proposed project; however construction would occur over a shorter distance and shorter time frame because of the reduced pipeline length. Similar to the proposed project, the Alternative Aqueduct Diversion Pipeline Alternative would result in less significant short-term construction noise impacts. Overall, impacts on noise under the Alternative Aqueduct Diversion Pipeline Alignments Alternative would be comparable to the proposed project.

3.9.2.7 Alternative 4- No Project Alternative

The No Project Alternative would involve the construction of up to 280 single family homes on approximately 50 acres of the project site. Construction activities related to home building would be similar to those associated with the proposed project. Construction equipment would be required to grade and excavate pads for houses, foundations, utility trenches, roads and other facilities. The types of equipment would be comparable to those required for the proposed project and the physical areas involved in grading and excavation could be considerably larger. Overall, the No Project Alternative would result in similar noise impacts to the proposed project. With regard to operations, single family residences would result in higher ambient noise levels than the proposed project. Noise from garden and lawn maintenance equipment, motor vehicles, children playing, audio and visual equipment, pets, and other common household appliances would intermittently be prevalent and audible above background levels. However, because these noises commonly are associated with residential neighborhoods and are not expected to exceed standards, the impacts would not be considered significant

3.9.3 Mitigation Measures and Monitoring Program

As impacts of the project are considered less than significant, not mitigation is required. However, the measures in Table 3.1-1 would serve ensure that noise at sensitive receptors does not exceed threshold levels.

Table 3.9-1. Mitigation Monitoring Program

Mitigation Measure	*Responsible Party*	*Timing/Frequency*
Noise-1.1: Construction Equipment. Construction equipment powered by internal combustion engines shall be properly muffled and maintained	City of Palmdale/ Contractor	During project construction.
Noise-1.2: Idling Prohibitions. Unnecessary idling of internal combustion engines near noise-sensitive areas shall be prohibited.	City of Palmdale/ Contractor	During Project Construction.
Noise-1.3: Equipment Location. Stationary noise-generating construction equipment, such as air compressors and portable power generators, shall be located as far as practical from existing noise-sensitive land uses.	City of Palmdale/ Contractor	During project construction.

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3.10 Transportation and Circulation

Transportation and circulation is the movement of people by all modes including vehicles, pedestrian, transit, bicycle, and emergency transportation, and the provision of support facilities such as parking. This section describes existing transportation facilities in the project vicinity including the existing roadway network and transportation facilities, as well as current circulation elements (bikeways, bridges, and parking conditions). This section also describes changes resulting from the proposed project to characterize the transportation and circulation condition of the project site and surrounding areas that would be affected by the implementation of the proposed project. There are no transit, light rail, or airport facilities in the project vicinity; therefore, these types of facilities will not be discussed in this section.

3.10.1 Environmental Setting

3.10.1.1 Area of Influence

The Area of Influence for this impact analysis includes those transportation facilities and circulation elements closest to the project site that may be affected by construction traffic or additional street traffic generated by the proposed project. This area includes, but is not limited to, Elizabeth Lake Road to the south, 25th Street West/Highland Avenue to the east, and 20th Street West to the east.

3.10.1.2 Setting

3.10.1.2.1 Roadway Network

The circulation system serving the project site consists of regional arterial streets (i.e., a major road used for through traffic and serves a regional function as well as local needs); major arterials (i.e., roads spaced at approximately one-mile intervals and represent the major carrying capacity for traffic to and within the City); and secondary arterials (i.e., roads designated at approximately one-half mile intervals between the major arterials, and provide access to the major arterials). The primary components of this street network are illustrated in Figure 3.10-1 and are discussed below.

Elizabeth Lake Road, located immediately south of the project site, is a four lane, east-west regional arterial within the project area. Portions of the road west of the project site are currently being widened from two to four lanes. Elizabeth Lake Road continues west about six miles from the project site to Leona Valley and ultimately connects to Interstate 5 near the Ventura County border about 40 miles further west. On the east, Elizabeth Lake road turns into Palmdale Boulevard which connects the City of Palmdale with the City of Victorville to the east. Within the project area, there is one signalized intersection located at the Elizabeth Lake Road and 25th Street West/Highland Avenue.

20th Street West, located immediately east of the project site, currently terminates about a block north of Elizabeth Lake Road and south of Amargosa Creek. North of the project area, 20th Street West is a two-lane, north-south major arterial that extends from north of Avenue K to Avenue P-8 West. The City of Palmdale has approved the southerly extension of 20th Street West from its existing southern terminus at Avenue P-12 to a new terminus at Elizabeth Lake Road at which intersection a new traffic signal will be installed. The new roadway extension will include two lanes in both directions with shoulders, curb, gutter and sidewalks on both sides. At the intersection of Elizabeth Lake Road, the new roadway extension will widen to six lanes with a raised median. The proposed six lanes at Elizabeth Lake Road include two northbound lanes and a dedicated right-turn lane plus two southbound left-turn lanes and one right-turn lane. In order to extend 20th Street West to Elizabeth Lake Road, a new bridge will be constructed over Amargosa Creek. The bridge will carry four lanes of traffic with a shoulder and a sidewalk on each side. Concrete bicycle and pedestrian trails with a width of 16 feet will be constructed between the channel and the bridge abutments along the creek

banks. Within the project area, the existing 20th Street W/Elizabeth Lake Road intersection is controlled by a one-way stop at the two south-bound lanes (a right- and left-turn lane) of 20th Street West.

25th Street West/Highland Avenue, bisects the project and is a four lane, north-south secondary arterial from Rancho Vista Blvd. to Elizabeth Lake Road. The intersection of Elizabeth Lake Road and 25th Street West/Highland Avenue is signalized in all directions.

Bridge Road is a two-lane, north-south connector road that joins W. City Ranch Road to Elizabeth Lake Road from the south. Within the project area, the Elizabeth Lake Road/Bridge Road intersection is currently barricaded due to construction activities associated with the widening of Elizabeth Lake Road with no access between the two streets.

Louise Lane is a two-lane, north-south collector road that connects the adjacent residential neighborhood with Elizabeth Lake Road. Within the project area, the Elizabeth Lake Road/Louise Lane intersection is controlled by a one-way stop on the north-bound lane of Louise Lane.

Delta Way is a two-lane, north-south collector road that connects the adjacent residential neighborhood with Elizabeth Lake Road. Within the project area, the Elizabeth Lake Road/Delta Way intersection is controlled by a one-way stop on the north-bound lane of Delta Way.

3.10.1.2.2 Bikeways

One existing multi-use trail (i.e., for pedestrian, equestrian, and bicycle use), the Joshua Ranch Trail, is located within the vicinity of the proposed project. Joshua Ranch Trail is generally an east-west trail located on the west side of the City of Palmdale and bounded by Rancho Vista Boulevard to the north, Elizabeth Lake Road to the south, Godde Hill Road to the west and Highland Street (25th St. West) to the east. The east entrance to Joshua Ranch Trail is located approximately ¾-miles west of Highland Street (25th St. West) along the alignment of Avenue P-12 (south of Highland High School). The trail extends approximately 3.2 miles to the west until it meets with the east boundary of Warnack Nature Park (50th St. West alignment). Warnack Nature Park is an existing 132-acre open space nature park owned by the City of Palmdale.

One additional multi-use trail has been adopted in the vicinity of the project area, but has not yet been built. This path runs along Elizabeth Lake Road roughly between 25th Street West/Highland Avenue and Rancho Vista Blvd. The City's multi-use trails link with an extensive trial system planned by L.A. County and the City of Lancaster.

3.10.1.2.3 Bridges

There is one existing bridge (25th Street West/Highland Avenue Bridge) and one proposed bridge (20th Street West Bridge) in the project area. The 25th Street West/Highland Avenue Bridge was replaced in 2000 with a cast-in-place pre-stressed box-girder concrete structure supported by two abutments on the ends. It carries four lanes of traffic with a shoulder and side walk on each site and serves as the crossing point for 25th Street W/Highland Avenue of Amargosa Creek.

In order to extend 20th Street West to Elizabeth Lake Road, a new bridge, the 20th Street Bridge, will be constructed over the Amargosa Creek. The proposed bridge is a cast-in-place pre-stressed box-girder concrete structure supported by two abutments on the ends. The bridge will carry four lanes of traffic with a shoulder and a sidewalk on each side

3.10.1.2.4 Parking

Local residential streets provide on- and off-street parking for residential uses in the vicinity of the project area. Parking for recreational uses in the area is provided by on-street parking along Elizabeth Lake Road and on local residential streets.

3.10.1.3 Regulatory Setting

3.10.1.3.1 City of Palmdale General Plan- Circulation Element

The City of Palmdale General Plan, Circulation Element, provides a blueprint for construction and maintenance of a transportation network that will accommodate growth, support economic development, allow safe and convenient access, and meet regional transportation goals. The Circulation element contains goals, objectives, and policies relevant to the City's transportation system that guide construction and maintenance of the network within the City. These goals, objectives, and policies are intended to serve as long-term principles and policy statements.

3.10.1.3.2 City of Palmdale General Plan- Parks, Recreation, and Trails Element

The City of Palmdale, Parks, Recreation, and Trails Element, contains goals, objectives, and policies that serve as a guide for future development of parks, recreational facilities, multi-use trails, bikeways, and open space areas to serve the recreation needs of existing and future City residents. These goals, objectives, and policies contained in the element serve as long-term principles and policy statements.

3.10.2 Impacts and Mitigation Measures

3.10.2.1 Methodology

Impacts on transportation and circulation that would result from the proposed project were identified by comparing existing service capacity and facilities against anticipated future demand associated with construction and operation of the proposed project.

3.10.2.2 Significance Criteria

Consistent with the City's Circulation Element standards and CEQA Guidelines *Appendix G* Environmental Checklist Form, the proposed project would have a significant impact on transportation and circulation if it would result in one or more of the following conditions:

TRANS-1: Cause the average daily traffic on roadways to exceed acceptable capacity (LOS C);

TRANS-2: Result in inadequate emergency access; or

TRANS-3: Result in inadequate parking capacity.

Project development would not result in the exceedance of the following threshold criteria, and they therefore are not discussed further:

- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections), or incompatible uses (e.g., farm equipment), or require access that would create an unsafe condition.

- *The project would not improve any roadways in the project vicinity; therefore, increased hazards due to design feature (e.g., sharp curves or dangerous intersections), or incompatible uses, or access points that would create an unsafe condition would not occur.*

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
  - *The project would not affect air traffic.*
- Exceed, either individually or cumulatively, a level of service standard established by the Los Angeles County congestion management agency for designated roads or highways.
  - *The project would not affect roads or highways designated as part of the County of Los Angeles CMP system.*

3.10.2.3 Proposed Project

Impact TRANS-1: The proposed project would not cause the average daily traffic on roadways to exceed acceptable capacity (LOS C).

Construction of the proposed project is expected to occur over a 12 month period and involve between 20 to 40 workers per week with a maximum of approximately 80 workers per week. Operation of the proposed project is expected to receive approximately 20 visitors per day many of whom would likely be local residents. During construction of the proposed project, local roadways would experience an increase in traffic from daily commutes by construction workers as well as construction-related truck trips. However, this increase in traffic would be temporary and is not expected to be substantial in relation to the existing traffic load and capacity. Increases in traffic from operational activities would be nominal. Therefore, transportation impacts related to construction and increased traffic would be less than significant.

Mitigation Measures

As impacts on acceptable traffic load or capacity would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on acceptable traffic load or capacity would be less than significant.

Impact TRANS-2: The proposed project would not result in inadequate emergency access.

The proposed project would have several access points along Elizabeth Lake Road that would provide adequate access for emergency response vehicles and personnel. The multi-use pathways located throughout the proposed project would be approximately 15-feet wide and adequately sized to accommodate travel by emergency response vehicles. Therefore, transportation impacts related to emergency access would be less than significant.

Mitigation Measures

As impacts on emergency access would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on emergency access would be less than significant.

Impact TRANS-3: The proposed project would not result in inadequate parking capacity.

The proposed project is expected to receive approximately 20 visitors per day. Although there would be an increased demand for parking at the Nature Park access points, adequate parking would be provided by on-street parking along Elizabeth Lake Road and in the surrounding residential neighborhoods. It is expected that the majority of the visitors to the Nature Park would be originating from the surrounding residential areas and would be walking or biking to the site. Therefore, project impacts related to parking capacity would be less than significant.

Maintenance and operation of the proposed project is expected to require one vehicle trip or less per day on average. When servicing the basins, there may be several vehicles for several days. These vehicles would park within the boundaries of the project site where adequate parking would be provided along the proposed berm roads. Therefore, project impacts related to parking capacity would be less than significant.

Mitigation Measures

As impacts on parking capacity would be less than significant, no mitigation is required.

Significance of Impacts After Mitigation

Impacts on parking capacity would be less than significant.

3.10.2.4 Alternative 1 –No In-Channel Recharge Basin

The No In-Channel Recharge Basins Alternative would reduce the amount of total acreage available for stormwater recharge, but would not alter the size of the nature park. Thus, anticipated average daily traffic generation due to visitors to the facility and operation and maintenance of the facility would not differ from the proposed project. Impacts to Elizabeth Lake Road, 25th Street West/Highland Avenue, and 20th Street West, and surrounding residential streets would be less than significant.

3.10.2.5 Alternative 2 – Reduced Off-Channel Recharge Basin

The Reduced Off-Channel Recharge Basin Alternative would eliminate three of the proposed off-channel basins located on 8.4 acres of the eastern portion of the project site. This area would instead become part of the Nature Park. However, anticipated average daily traffic generation due to visitors to the facility and operation and maintenance of the facility under this alternative would not differ from the proposed project. Impacts to Elizabeth Lake Road, 25th Street West/Highland Avenue, and 20th Street West, and surrounding residential streets would be less than significant.

3.10.2.6 Alternative 3 – Alternative Aqueduct Diversion Pipeline Alignments

The Alternative Aqueduct Diversion Pipeline Alignments Alternative considers two alternative alignments for the Aqueduct Diversion Pipeline. The other aspects of the project would remain as described in the proposed project. Thus, anticipated average daily traffic generation due to visitors to the facility and operation and maintenance of the facility would not differ from the proposed project. Impacts to Elizabeth Lake Road, 25th Street West/Highland Avenue, and 20th Street West, and surrounding residential streets would be less than significant.

3.10.2.7 Alternative 4 – No Project Alternative

The No Project Alternative would result in the construction of approximately 280 dwelling units on about 50 acres of the site. This would increase traffic on local roadways and potentially result in significant reductions in levels of service at local intersections. Compared to the Proposed Project, the No Project Alternative could involve substantially greater traffic and would have a much greater potential for adverse impacts. Provided the permits for new housing were conditioned on traffic improvements to accommodate the additional demand, the impacts would likely be adverse but less than significant.

3.10.3 Mitigation Measures and Monitoring Program

As no mitigation measures are required to address impacts on transportation and/or circulation resources, no mitigation monitoring program is required.

3.11 Other Resource Issues

This section discusses potential impacts on environmental issue areas determined to be minor and adverse, but less than significant, or no impact as required under CEQA Guidelines Section 15126. These impacts on public services, public recreation, and utilities and service systems are described below.

3.11.1 Public Services

The proposed project would not involve an additional demand for public services (police, fire protection, and medical care facilities). The project does not include construction of housing or facilities that would generate additional requirements for police or fire protection. The limited infrastructure proposed would be small and isolated from nearby structures (i.e. picnic ramadas) such that a fire within the UAP would be very unlikely and, if one were to be started, would also be unlikely to spread to adjacent structures.

The amount of visitor traffic expected to be generated by the nature park is approximately 20 out-of-area visitors per day. While people from the local community are expected to utilize the facilities, they currently have access to the existing open space and construction of the project is not expected to appreciably change that use. The minimal visitors from outside the local residential community would not create a substantial additional need for police protection nor would it place an undue burden on public roadways.

The proposed project would therefore not result in significant impacts to police, fire protection, or public roadways. The alternatives, not including the No Project Alternative, are also expected to have less than significant impacts in these areas. The No Project Alternative would result in some additional demand for police and fire protection and would likely place a substantially greater burden on public roadways than the Project or its alternatives. However, this impact is still expected to be less than significant.

3.11.2 Public Recreation

The UAP includes a community nature park as a key component. The park would consist of 38 acres of native and restored habitat with interpretive displays; information signage relating to native plants and wildlife; a Heritage Habitat area consisting of existing native trees, shrubs, and restored and natural ground cover; hiking and biking trails; and armadas with picnic tables for public use. The project would therefore add a recreation facility to the local park and recreation system that does not currently exist.

As a consequence, the proposed project would have a beneficial impact to public recreation. All of the alternatives, with the exception of the No Project Alternative, would also include the community nature park component and would likewise result in a beneficial impact too public recreation. Alternative 2, which involves reducing the size of the off-channel recharge facility, would result in approximately 44 acres of community nature park, an incremental increase of six acres made available by the elimination of three recharge basins, therefore providing somewhat more physical area to the nature park.

The No Project Alternative may not formally include a park, although a residential development may very well include some open space and park-like amenities. However, because of building constraints on the site which would not permit housing to be constructed in the flood plain of the creek, much of the land allocated in the proposed project to the nature park would be consumed by housing. Therefore, whatever park-like amenities would be included in the No Project Alternative would be considerably smaller than those proposed for the UAP.

3.11.3 Utilities and Service Systems

The UAP involves a minimum of utility service requirements. The SWP diversion Turnout at the California Aqueduct will involve electric pumps to extract water from the aqueduct and divert it by pipeline to the project's diversion point and into the Collector Pipeline for delivery to the off-channel recharge basins. The Turnout from the SWP is approximately 200 feet higher in elevation than the receiving end of the Collector Pipeline and the water would therefore flow by gravity from the Turnout to the Collector Pipeline. Minimal electricity would be required to operate the pumps since the lift is minimal and the downgradient pipe will act as a siphon once water begins to flow. Therefore, direct electricity use by the project will be minimal.

The project is proposed to be lighted by solar powered lights so that utility runs do not need to be installed throughout the project site. Solar lighting would not draw on the electricity grid and would therefore have no impact on electric utilities.

Irrigation of the native restoration areas would occur during initial vegetation establishment. Irrigation water would be supplied by existing municipal water supplies. The amounts required would be minimal and would diminish as the native species become established. After a period of a few years, irrigation would be discontinued and the native vegetation would be allowed to rely, as it does normally, on natural precipitation. Therefore, project demand for water would be in limited amounts and for a limited duration.

There is the potential for some concern on the part of the public regarding the effects that recharging water from Amargosa Creek or the SWP would have on the quality of water subsequently withdrawn from the aquifer for human consumption. Section 3.7.2.3.2 addresses this issue and concludes that the impact would be less than significant. This based on the fact that water from both Amargosa Creek during runoff events and from the SWP has similar or lower concentrations of contaminants compared to the Antelope Valley Groundwater Basin. In addition, the recharged water would be mixed into the aquifer before withdrawal and withdrawn water would be treated to legally mandated drinking water standards prior to delivery to customers. Therefore, the impact of the proposed project on the quality of drinking water would be less than significant.

There would be no requirement for sewer, natural gas, or other utilities by the UAP and no impacts to these service systems would occur.

In summary, impacts to all utilities and service systems related to the proposed project and its alternatives, except the No Project Alternative, would be minimal and less than significant. There would be no appreciable difference between the alternatives in this regard.

The No Project Alternative could result in the construction of up to 280 residential units. Therefore, the No Project Alternative would involve increases in demand for electricity, water, sewer, and natural gas service. While it is not possible to determine the significance of such impacts, they would be greater than those associated with the proposed project and the other alternatives.

4 Cumulative Impacts

This chapter addresses the requirements for cumulative impact analysis, as well as the actual analysis of the potential for the proposed project, together with other past, present, and reasonably foreseeable future projects in each resource area's cumulative geographic scope, to have significant cumulative effects. Following the presentation of the requirements related to cumulative impact analysis and a description of the related projects (Section 4.1 and 4.2, respectively), the analyses in Section 4.3 address each of the resource areas for which the proposed project may make a cumulatively considerable contribution to cumulative impacts when combined with other reasonably foreseeable projects in the area.

4.1 Requirements for Cumulative Impact Analysis

The CEQA Guidelines (14 CCR 15130) require a reasonable analysis of the significant cumulative impacts of a proposed project. A cumulative impact is defined by CEQA as "*two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts*" (CEQA Guidelines, Section 15355).

According to Section 15130 of the CEQA Guidelines, cumulative impacts shall be discussed when the project's incremental effect is cumulatively considerable. The discussion of cumulative impacts needs to reflect the severity of the impacts and the likelihood of occurrence, but the discussion does not need to go into as great detail as is provided for the effects attributable to the project alone. According to the Guidelines, the following elements are necessary for an adequate discussion of significant cumulative impacts:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or
- A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document that has been adopted or certified, which described or evaluated regional or area-wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the Lead Agency; and
- A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available, and a reasonable analysis of the cumulative impacts of the relevant projects. The EIR shall examine reasonable options for mitigating or avoiding any significant cumulative effects of a proposed project.

Therefore, the following cumulative impact analysis focuses on whether the impacts of the proposed project are cumulatively considerable within the context of impacts attributable to other past, present, or future projects. The cumulative impact analysis considers other projects proposed within the geographic area defined for each resource that have the potential to contribute to cumulatively considerable impacts. For purposes of thresholds, the concept of "cumulatively considerable" effects, as derived from the CEQA:

> *"Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Sections 21083 [Law] and 15065 [Guidelines]).*

For this EIR, related area projects with a potential to contribute to cumulative impacts were identified using one of two approaches: the "list" methodology or the "projection" methodology. Most of the resource areas were analyzed using a list of nearby projects provided by the City of Palmdale that would be constructed in the cumulative geographic scope (Table 4.1-1).

Table 4.1-1 Related Projects

No. in Figure 4.1-1	*Project Description*	*Address/Location*	*Residential/ Non-Residential*	*Status*
1	Subdivide 539 Single-Family Lots, 1 Commercial Lot, and Open Space Lots.	North of Elizabeth Lake Road, 1,000 feet west of 30th Street West.	Residential	Phases 1-3 Complete/ Phases 4-5 Pending
2	Subdivide 50 acres into 240 lots and 2 parks.	Parkview Drive and Westland Drive.	Residential	Approved
3	Subdivide 92 acres into 4 lots.	South of Elizabeth Lake Road and east of Ranch Center Drive within the Ritter Ranch Specific Plan.	Residential	Approved
4	Subdivide 126 lots.	Northeast corner of Westland Drive and Parkview Drive – Planning Unit 5W – Ritter Ranch	Residential	Pending
5	Subdivide 125 lots.	Approximately 2,700 feet south of Elizabeth Lake Road west of 40th Street West – Planning Unit 5V – Ritter Ranch.	Residential	Pending
6	Subdivide 59 lots.	Approximately 2,700 feet south of Elizabeth Lake Road west of 40th Street West – Planning Unit 5D – Ritter Ranch.	Residential	Pending
7	Subdivide 82 lots.	Approximately 2,700 feet south of Elizabeth Lake Road west of 50th Street West – Planning Unit 5D – Ritter Ranch	Residential	Pending
8	Subdivide 106 lots.	Southeast corner of Westland Drive and Parkview Drive – Planning Unit 5W – Ritter Ranch..	Residential	Pending
9	Subdivide 53 lots.	Southwest of Westland Drive and Parkview Drive – Ritter Ranch.	Residential	Pending
10	Subdivide 472 acres into 350 single-family lots, 3 detention basin lots, 1 school site, 1 fire station, 33 open space lots, and 13 natural open spaces.	South side of Avenue S, west of Parkwood Drive within the City Ranch Specific Plan.	Residential	Approved
11	Subdivide 472 acres into 9 parcels.	South side of Avenue s, west of Ranch Center Drive	Residential	Approved
12	Subdivide 53 lots.	Parkwood Drive and Magnolia within the City Ranch Specific Plan.	Residential	Pending
13	Subdivide 117 lots.	Parkwood Drive within the City Ranch Specific Plan.	Residential	Pending
14	Subdivide 81 lots.	Parkwood Drive and Greenbrier Street within the City Ranch Specific Plan.	Residential	Pending
15	Subdivide 126 lots.	Parkwood Drive and Greenbrier Street within the City Ranch Specific Plan.	Residential	Pending
16	Develop a 12 acre park.	The Groves, east of Parkwood Drive	Residential	Approved. Under Construction

Table 4.1-1 Related Projects (continued)

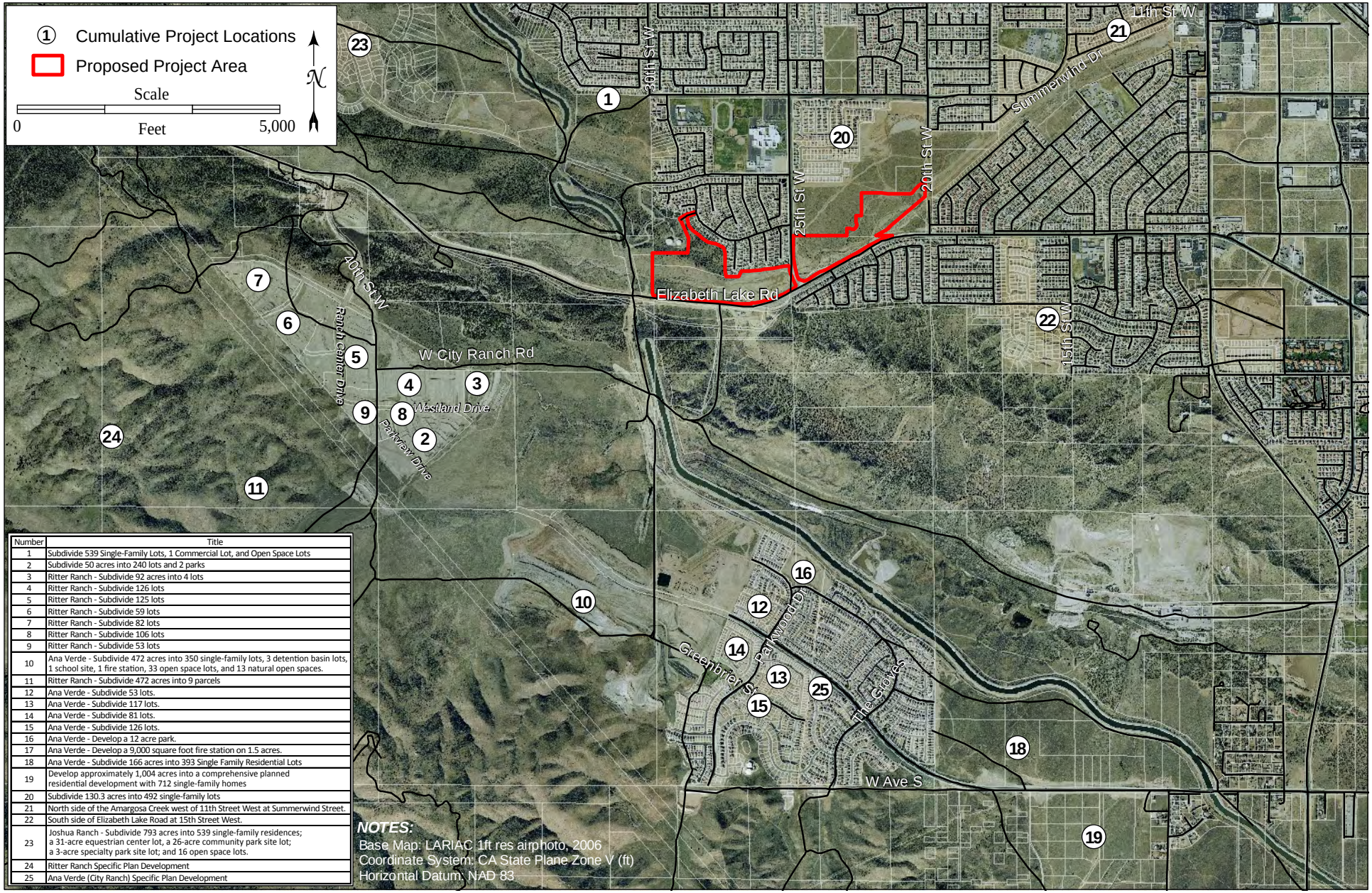
No. in Figure 4.1-1	*Project Description*	*Address/Location*	*Residential/ Non-Residential*	*Status*
17	Develop a 9,000 square foot fire station on 1.5 acres.	Avenue S and Estancia Street.	Residential	Approved
18	Subdivide 166 acres into 393 Single Family Residential Lots.	North side of Avenue S, between east boundary of City Ranch Specific Plan and California Aqueduct.	Residential	Pending
19	Develop approximately 1,004 acres into a comprehensive planned residential development with 712 single-family homes.	Approximately 1.2 miles west of SR-14 and south of Avenue S.	Residential	Pending
20	Subdivide 130.3 acres into 492 single-family lots.	North side of Amargosa Creek east of 25th Street West and west of 20th Street East.	Residential	Inactive
21	Subdivide 55 acres into 330 lots	North side of the Amargosa Creek west of 11th Street West at Summerwind Street.	Residential	Active
22	Subdivide 40 acres into 71 single family lots.	South side of Elizabeth Lake Road at 15th Street West.	Residential	Active
23	Subdivide 793 acres into 539 single-family residences; a 31-acre equestrian center lot, a 26 acre community park site lot; a 3 acre specialty park site lot; and 16 open space lots.	North of Elizabeth Lake Road and west of the California Aqueduct within Joshua Ranch.	Residential	Inactive
24	Ritter Ranch Specific Plan Development.	West, southwest, and south of Elizabeth Lake Road and 20th Street west within Ritter Ranch.	Residential/Non-residential	Inactive
25	Ana Verde (City Ranch) Specific Plan Development.	South and southeast of Elizabeth Lake Road and 20th Street West.	Residential/Non-residential	Inactive

4.2 Projects Considered for Cumulative Analysis

A total of 25 present or reasonably foreseeable future projects (approved or proposed) were identified within the general vicinity of the proposed project that could contribute to cumulative impacts. A list of the cumulative projects provided by the City of Palmdale is provided in Table 4-1, and the corresponding locations of these projects are shown on Figure 4-1.

4.3 Cumulative Impacts Analysis

The project's cumulative impact is the project's contribution to the combined impacts caused by all the approved and proposed projects listed in Table 4.1-1 and mapped on Figure 4.1-1. The following sections analyze the cumulative impacts identified for each environmental resource issue analyzed in Chapter 3.0.



Number	Title
1	Subdivide 539 Single-Family Lots, 1 Commercial Lot, and Open Space Lots
2	Subdivide 50 acres into 240 lots and 2 parks
3	Ritter Ranch - Subdivide 92 acres into 4 lots
4	Ritter Ranch - Subdivide 126 lots
5	Ritter Ranch - Subdivide 125 lots
6	Ritter Ranch - Subdivide 59 lots
7	Ritter Ranch - Subdivide 82 lots
8	Ritter Ranch - Subdivide 106 lots
9	Ritter Ranch - Subdivide 53 lots
10	Ana Verde - Subdivide 472 acres into 350 single-family lots, 3 detention basin lots, 1 school site, 1 fire station, 33 open space lots, and 13 natural open spaces.
11	Ritter Ranch - Subdivide 472 acres into 9 parcels
12	Ana Verde - Subdivide 53 lots.
13	Ana Verde - Subdivide 117 lots.
14	Ana Verde - Subdivide 81 lots.
15	Ana Verde - Subdivide 126 lots.
16	Ana Verde - Develop a 12 acre park.
17	Ana Verde - Develop a 9,000 square foot fire station on 1.5 acres.
18	Ana Verde - Subdivide 166 acres into 393 Single Family Residential Lots
19	Develop approximately 1,004 acres into a comprehensive planned residential development with 712 single-family homes
20	Subdivide 130.3 acres into 492 single-family lots
21	North side of the Amargosa Creek west of 11th Street West at Summerwind Street.
22	South side of Elizabeth Lake Road at 15th Street West.
23	Joshua Ranch - Subdivide 793 acres into 539 single-family residences; a 31-acre equestrian center lot, a 26-acre community park site lot; a 3-acre specialty park site lot; and 16 open space lots.
24	Ritter Ranch Specific Plan Development
25	Ana Verde (City Ranch) Specific Plan Development

Figure 4-1. Related Projects Location Map

4.3.1 Aesthetics and Visual Resources

4.3.1.1 Scope of Analysis

The geographic scope of analysis for cumulative impacts on aesthetics and visual resources is scenic resources, including Elizabeth Lake Road, from which one may see the proposed project, either as part of a single view or a series of related views. Outside of this area, the proposed project would not be within public views and therefore would have no potential to contribute to cumulative visual impacts. Past, present, planned, and foreseeable future development that could contribute to cumulative impacts on aesthetics and visual resources are those that have involved, or would involve, grading, paving, landscaping, and construction of roads or buildings.

4.3.1.2 Impacts of Past, Present, and Reasonably Foreseeable future Projects

Reasonably foreseeable development listed in Table 4-1 includes buildout of the City of Palmdale, including residential projects. Many of the infill projects would not likely contribute to a substantial change in the region's visual resources or character, as they would be surrounded by existing residential or commercial structures and landscaping that have defined precedents for height, massing, landscaping, and color, and would be within smaller parcels that do not have relatively important topographic, vegetation , or other unique visual qualities. However, many of the future developments represent larger expanses of undeveloped, natural lands on the periphery of the City of Palmdale. These sites, such as Ritter Ranch, City Ranch, and Joshua Ranch, constrain important visual qualities that would be compromised by their development, as experienced from surrounding views. The conversion of undeveloped, natural areas to residential, commercial, and/or industrial development under reasonably foreseeable cumulative buildout would likely result in significant cumulative impacts on important visual resources.

4.3.1.3 Contribution of the Proposed Project

Views of the proposed project area are available from the public view corridors, including Elizabeth Lake Road, 25th Street West/Highland Avenue, 20th Street West, and residential development to the north and south of the project site. Short-term impacts resulting from construction activities (i.e., clearing, grubbing, grading, and excavation) would temporarily alter the visual character of the project site and its surroundings. The project would not introduce new sources of light and glare; construction would occur during daylight hours and for a limited duration; and project operations would result in a minimal change in the level of night light illumination when compared to what is presently generated over the project site. As the proposed project would not substantially alter any scenic vistas, degrade the existing visual character, or produce substantial light or glare, the project's contribution to cumulative effects would be a less than cumulatively considerable.

4.3.2 Air Quality

4.3.2.1 Scope of Analysis

The region of analysis for cumulative effects on air quality is the Mojave Desert Air Basin (MDAB). However, the highest impacts under the proposed project in the context of past, present, and reasonably foreseeable projects (Table 4.1-1) would occur within the areas adjacent to the proposed project within the City of Palmdale and the unincorporated portions of Los Angeles County.

4.3.2.2 Impacts of Past, Present, and Reasonably Foreseeable Future Projects

The Antelope Valley currently attains all national ambient air quality standards except the ozone (O_3), PM_{10}, and $PM_{2.5}$ standards. It is in attainment of all State ambient air quality standards except the O_3, PM_{10} and is

unclassified for hydrogen sulfide, vinyl chloride, and visibility reducing particles. These nonattainment conditions for ambient O_3, PM_{10}, and $PM_{2.5}$ within the project region are therefore cumulatively significant. Reasonably foreseeable future projects identified in Table 4-1 that would overlap in time with construction of the proposed project would contribute to theses significant cumulative impacts. Residential development would also contribute to pollutant emissions over the long term into the future, a cumulative air quality impact.

4.3.2.3 Contribution of the Proposed Project

Emissions of O_3 precursors and PM_{10} and $PM_{2.5}$ from the proposed construction activities, in combination with emissions from future sources and approved projects in the region, would exacerbate the existing O_3, PM_{10} and $PM_{2.5}$ nonattainment conditions within the Antelope Valley. Emissions from operation of the project would not exceed the construction annual or daily thresholds. Construction equipment and schedules would be required to implement standard AVAQMD dust control measures and construction emissions are included in the region's air attainment planning process. As a result, the projects contribution from proposed construction activities would be less than cumulatively considerable.

Emissions of O_3 precursors and PM_{10} and $PM_{2.5}$ due to operation of the proposed project, in combination with emissions from future sources and approved projects in the region, would exacerbate the existing ozone nonattainment status within the Antelope Valley. However, emissions from operation of the project would not exceed the operational annual or daily thresholds. As a result, operation of the project would contribute less than cumulatively considerable air quality impacts.

4.3.3 Biological Resources

4.3.3.1 Scope of Analysis

The geographic region of analysis for biological resources differs by organism groups such as birds, fish, marine mammals, plankton, and benthic invertebrates. The mobility of species in these groups, their population distributions, and the normal movement range for individuals living in an area varies so that effects on biotic communities in one area can affect those communities in other nearby areas. For terrestrial biological resources (excluding water-associated birds), the geographic region of analysis is limited to those land areas at the proposed project sites and extending approximately 1 mile (1.6 km) in all directions.

Past, present, and reasonably foreseeable future development that could contribute to cumulative impacts on terrestrial resources are those projects that involve land disturbance such as grading, paving, landscaping, construction of roads and buildings, and related noise and traffic impacts. Noise, traffic, and other operational impacts can also be expected to have cumulative impacts on terrestrial species.

4.3.3.2 Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Projects considered in the cumulative analysis could have impacts on biological resources, such as sensitive plant and wildlife species, native desert plant communities, and riparian habitat that would be cumulatively significant but feasibly mitigated. The permitting process should ensure that significant impacts of these projects individually are mitigated through environmental review for each project. However, their cumulative impact could be significant as continued development degrades or displaces native habitat.

4.3.3.3 Contribution of the Proposed Project

The proposed project would have significant impacts to special status species (**Impact BIO-1**), special status vegetation communities (**Impact BIO-2**), migratory/breeding birds (**Impact BIO-3**), local biological

communities through introduction of invasive species (**Impact BIO-4b**), and native desert vegetation including California juniper and Joshua trees protected by local ordinance (**Impact BIO-5**). The project's nature park and revegetation elements would also improve existing native habitat compared to existing conditions. Prior to mitigation, these impacts could contribute substantially to cumulative effects of past, present, and future projects. With implementation of the mitigation measures described in Section 3.3, residual impacts of the proposed project would be less than significant, and the project's contribution to cumulative effects would be less than cumulatively considerable.

4.3.4 Cultural Resources

4.3.4.1 Scope of Analysis

The geographic region of analysis for cumulative effects on archaeological and historical resources consists of the Leona Valley area. Projects that would involve the loss, destruction, or alteration of archeological resources or historical resources from the same time period or involving similar activities as those associated with the archaeological or historical resources found within the vicinity of the project site have the potential to contribute to cumulative impacts on cultural resources.

4.3.4.2 Impacts of Past, Present, and Reasonably Foreseeable future Projects

The reasonably foreseeable cumulative development projects identified in Table 4-1 would include ground disturbing activities during construction (i.e., clearing, grubbing, grading, and excavation) have the potential to affect prehistoric and historic archaeological sites and historic structures. These disturbances may represent cumulatively significant impacts on cultural or paleontological resources. Impacts would be addressed for each discretionary project during plan review, and standard conditions would be applied as necessary to minimize these effects, resulting in a less than significant cumulative impact.

4.3.4.3 Contribution of the Proposed Project

Ground disturbing activities associated with the proposed project are unlikely, but have the potential to result in significant adverse effects. Therefore, prior to mitigation the proposed project, together with other reasonably foreseeable projects identified in Table 4-1, could have a cumulatively significant impact on cultural resources. However, implementation of mitigation measures listed in Section 4.3 would minimize the project's potential for disturbing cultural resources. Therefore, the project's contribution to cumulative effects would be less than cumulatively considerable.

4.3.5 Geology and Soils

4.3.5.1 Scope of Analysis

The geographic scope for cumulative impacts varies for geological resources, depending on the geologic issue. The geographic scope with respect to seismicity is the City of Palmdale area, as an earthquake capable of creating substantial damage or injury at the proposed project site could similarly cause substantial damage or injury throughout this area. The geographic scope with respect to subsidence/settlement, expansive soils, and unstable soil conditions would be confined to the proposed project area, as these impacts are site-specific and relate primarily to construction techniques.

4.3.5.2 Impacts of Past, Present, and Reasonably Foreseeable future Projects

Most cumulative projects would involve some alteration of topography by grading during site preparation and construction. Hillside development may result in considerable alteration of the topography in a locality.

Grading typically exposes soils to wind and water erosion although mitigation measures, such as dust control to mitigate air quality impacts and erosion control via a Storm Water Pollution Prevention Plan may reduce those impacts considerably. Those projects in close proximity to the San Andreas Fault zone share the project's potential for significant impacts related to ground shaking, although none should be directly in the fault zone and subject to ground rupture. In general, the cumulative projects share the same geologic and soils constraints as the UAP and would be required to mitigate for those potential impacts. The cumulative geology and soils impacts would be less than significant.

4.3.5.3 Contribution of the Proposed Project

The proposed Project has the potential, due to the groundwater recharge activities, to raise groundwater levels. Liquefaction (when saturated soils lose cohesion and behave like a liquid during an earthquake) could potentially occur in areas where the groundwater level was allowed to reach within 40 feet of the surface. The current groundwater level is at approximately 350 feet, so the immediate risk is very low. However, the potential impact can be mitigated to less than significant levels by installing and monitoring one or more wells downgradient of the project recharge basins and ensuring that groundwater levels do not approach the surface by less than 40 feet. With this mitigation, the project's contribution to cumulative geology and soils impacts would be less than cumulatively considerable.

4.3.6 Hazards and Hazardous Materials

4.3.6.1 Scope of Analysis

The geographic scope for cumulative impacts associated with spills of hazardous materials encompasses the City of Palmdale area. The importance of regional projects diminishes with distance from the project site as potential adverse impacts diminish in magnitude with distance. Thus, past, present, and reasonably foreseeable future projects that could contribute to these cumulative impacts include those projects that transport hazardous materials in the vicinity of the proposed project site.

4.3.6.2 Impacts of Past, Present, and Reasonably Foreseeable future Projects

Storage and use of low concentrations of hazardous materials at residential projects would have the potential to result in a significant cumulative impact.

4.3.6.3 Contribution of the Proposed Project

Compliance with applicable federal, state, and local regulations during project construction and operation would ensure that the use and storage of hazardous materials would be undertaken in a safe and prudent manner. In addition, operation of the proposed project would have little potential for the transportation, use, or disposal of hazardous materials and would not create a significant hazard to the public or environment through the presence of soil or groundwater contamination. As such, the project's contribution to cumulative effects on public health related to public exposure to hazardous materials would result in a less than cumulatively considerable impact.

4.3.7 Hydrology and Water Quality

4.3.7.1 Scope of Analysis

The geographic region of analysis for cumulative effects on groundwater quality and quantity would be projects located within the groundwater basin affected by the proposed project. The geographic region of

analysis for cumulative effects on surface water quality and quantity would be projects located within immediate proximity to Amargosa Creek.

If a project will directly or indirectly cause a net decrease in groundwater quantity or quality in an overdrafted basin, this would be considered a potentially significant cumulative impact. Any project that will cumulatively contribute to degradation of the quality of surface water or cause surface water bodies to fail to meet water quality objectives set by the Lahontan RWQCB would be considered a potentially significant cumulative impact. Potential on-site and off-site flooding hazards are considered with respect to other projects within the same watershed. Cumulative impacts are considered significant if the proposed project, in combination with other projects in the watershed, would contribute to downstream flooding.

4.3.7.2 Impacts of Past, Present, and Reasonably Foreseeable Future Projects

In general, construction for residential development would not cause significant groundwater or surface water impacts provided construction was done consistent with a Storm Water Pollution Prevention Plan and that appropriate erosion control measures were implemented as would typically be required in the project's permit. It is also assumed that any construction involving the potential discharge of stormwater to Amargosa Creek would incorporate appropriate stormwater discharge management measures to prevent pollutant discharge. Therefore, construction of cumulative projects would not be expected to cause a significant cumulative water quality or quantity impact.

However, once residential units are occupied, they create a demand for water. Given that the existing water delivery system is unable to provide sufficient water to all potential users at all times, cumulative residential development would be considered to have a cumulatively significant adverse effect on water availability. In addition, stormwater runoff from streets and highways, as well as irrigation water contaminated with pesticides or fertilizers from yards and gardens, can increase the pollutant load of water discharged to the storm drain system, much of which discharges ultimately into Amargosa Creek. Therefore, the cumulative water quality and quantity impacts of cumulative development absent the proposed Project are potentially significant.

4.3.7.3 Contribution of the Proposed Project

The proposed Project would have less than significant impacts on water quality and quantity with implementation of mitigation to ensure that construction equipment is not used in the creek bed when it could be caught in floodwaters during a sudden rainstorm. The contribution of the UAP to cumulative water quality and availability impacts would be less than cumulatively considerable.

Operation of the UAP would provide additional groundwater to the Antelope Valley Groundwater Basin that could subsequently be withdrawn to provide for future demand for water. Therefore, the proposed Project would not cause any additional reduction in either the quality or availability of water. Indeed, the UAP would enhance availability and potentially may future residential development possible without cumulatively significant impacts. The water quality and availability impacts of the proposed Project would be largely beneficial and would not be cumulatively considerable.

4.3.8 Land Use

4.3.8.1 Scope of Analysis

Since the proposed project has the capacity to affect land use within the project area and surrounding communities, the region of analysis for cumulative land use impacts includes the project area and also extends

to adjacent areas in close proximity to the project area. Past, present, and reasonably foreseeable future projects that could contribute impacts include projects with water-related public uses.

4.3.8.2 Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Cumulative development throughout the surrounding City of Palmdale would incrementally alter the area's semi-rural character and would result in the conversion of underdeveloped lands to suburban development. Reasonably foreseeable development of projects in the region would have the potential to introduce incompatible development relative to surrounding existing land uses. Potential incompatibilities between existing open space and development would be resolved on a case-by-case basis through the use of landscape buffers, setbacks, and appropriate architectural design. Reasonably foreseeable development listed in Table 4-1 would not disrupt or divide existing communities. Potential inconsistencies with plans and policies in the City of Palmdale General Plan associated with cumulative development would be addressed for each discretionary project during plan review, and standard conditions would be applied as necessary to minimize these effects. Thus, cumulative impacts would be less than significant.

4.3.8.3 Contribution of the Proposed Project

The proposed project would not result in incompatibility with existing land use or disrupt or divide established communities. Implementation of resource-specific mitigation measures would ensure project compliance with plans and policies in the City of Palmdale General Plan. Project residual impacts on land use would, therefore, be less than significant and would result in a less than cumulatively considerable impact.

4.3.9 Noise

4.3.9.1 Scope of Analysis

The geographic scope for cumulative noise impacts is the vicinity of the project site. The discussion of cumulative noise impacts addresses both construction and operational noise levels and vibration. Projects that could contribute to cumulative construction noise and vibration impacts include demolition, grading and construction projects in the vicinity of the proposed Project. Those that could contribute to operational noise and vibration impacts include projects in the vicinity of the project site that could exceed the standards set forth in the City of Palmdale General Plan Noise Element and the Chapter 8.28 of the City of Palmdale Municipal Code.

4.3.9.2 Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Reasonably foreseeable development listed in Table 4-1 would result in intermittent, short-term noise impacts throughout the project vicinity. The duration of these localized impacts would be limited to the construction phases of the individual projects. Construction activities taking place within the region would be subject to the standard measures and conditions regulating construction daily noise levels to ensure consistency with the City of Palmdale General Plan Noise Element policies and local noise ordinances. Buildout and operation of reasonably foreseeable projects would contribute to increased ambient noise levels in the region. Cumulative project operations would increase roadway noise levels. However, roadway noise would be conditioned as necessary by incorporation of noise reduction measures (i.e., sound walls), reducing cumulative noise impacts on sensitive noise receptors to less than significant.

4.3.9.3 Contribution of the Proposed Project

Noise from construction activities would contribute substantially to cumulative effects to past, present, and future projects during construction. Routine operational maintenance activities would generate sporadic,

short-term sources of noise. Short-term sources of noise generated by routine maintenance activities would not result in a substantial contribution to ambient noise levels because these sources would be infrequent. Proposed project operations would not generate substantial traffic trips along adjacent roadways, and roadway noise would not increase substantially. The proposed project's incremental short-term construction noise impacts would be significant and could contribute substantially to cumulative effects of past, present, and future projects. However, even with implementation of the mitigation measures described in Section 3.9, impacts of the proposed project would not be reduced to a less than significant level during construction. Therefore, the project's contribution to cumulative noise impacts during construction would be cumulatively considerable, though the impact would be of relatively short duration. Operation of the UAP would not result in a cumulatively considerable contribution to cumulative noise.

4.3.10 Transportation and Circulation

4.3.10.1 Scope of Analysis

The transportation environmental setting for the cumulative transportation and circulation analysis includes those streets and intersections that would be used by both automobile and truck traffic to gain access to and from the proposed project and past, present, and reasonably foreseeable future projects in the project vicinity, as well as those streets that would be used by construction traffic (i.e., equipment and commuting workers). These streets include Elizabeth Lake Road, 25th Street West/Highland Avenue, and 20th Street West.

4.3.10.2 Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Current levels of service on streets in the project vicinity are acceptable. Considerable additional traffic is to be expected as a result of additional developments along Elizabeth Lake Road to the west. However, Elizabeth Lake Road is currently being widened to four lanes in the project vicinity and this is expected to accommodate projected future traffic. Therefore, the cumulative impact of future development in the project vicinity is considered less than cumulatively considerable.

4.3.10.3 Contribution of the Proposed Project

The proposed Project would involve minimal traffic during construction and a very small amount of traffic during operations. The contribution of the proposed Project to cumulative transportation and circulation impacts would be less than cumulatively considerable.

4.3.11 Other Resource Issues

4.3.11.1 Scope of Analysis

The scope of the analysis for other resources is the City of Palmdale and the immediate vicinity of the UAP in Los Angeles County. The issues of concern are Public Services (primarily police, fire protection, and public roads), Public Recreation, and Utilities and Service Systems.

4.3.11.2 Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Future housing development would result in additional demand for police and fire protection and would likely place a substantially greater burden on public roadways than the project or its alternatives. However, the cumulative impact on Public Services from future development is expected to be less than significant as projects are anticipated and additional tax revenues to support these services would be collected by the city or county from property taxes and sales taxes generated by new residents.

Additional development would generate greater demand for Public Recreation facilities from new residents. Like Public Services, the additional tax revenues would be expected to provide funding for any expanded services necessary to address the need for recreation facilities. In addition, developments may be conditioned with requirements to include recreational amenities.

New residential development would require the provision of utilities and services including water, electricity, natural gas, telephone, and sewer lines. Generally, developments will be required to obtain "can and will serve" or equivalent commitments from utility providers, thereby ensuring that adequate service systems are provided.

In summary, the cumulative impact of development on Public Services, Public Recreation, and Utility and Service Systems is considered less than significant.

4.3.11.3 Contribution of the Proposed Project

The proposed project will make minimal demands on Public Services, Public Recreation, and Utility and Service Systems. The UAP will, in fact, increase the ability of local water purveyors to provide for future growth. The contribution of the proposed project to cumulative Public Services, Public Recreation, and Utility and Service Systems impacts is considered less than cumulative considerable and, in the area of water supply, it would be beneficial.

5 Alternatives Comparison

5.1 Introduction

CEQA requires that an EIR present a range of reasonable alternatives to the proposed project. Various alternatives were considered during preparation of this EIR. In addition to the proposed project, four alternatives, including the No Project Alternative, were analyzed to provide a reasonable range of alternatives and sufficient information about the environmental effects of potential alternatives such that informed decision-making can occur.

5.1.1 Alternatives Considered

The alternatives are described in Section 2.6.2. The alternatives evaluated in detail in Chapter 3 include:

- No In-Channel Recharge Basins;
- Reduced Off-Channel Recharge Basin Area;
- Alternative Aqueduct Pipeline Routes; and
- No Project Alternative.

5.1.2 Alternatives Eliminated from Consideration

The following alternatives were considered but eliminated from further analysis (see Section 2.6.3 for detailed descriptions):

- Single In-Channel Recharge Basin:
  - A single in-channel recharge basin would involve a larger earthen dam in the channel of Amargosa Creek upstream of the 25th Street West Bridge. This alternative was removed from further consideration because it would involve twice the excavation and create a substantially greater visual impact than in-channel basis for the proposed project.
- All In-Channel Recharge Basins:
  - All in-channel recharge basins would involve creating additional in-channel basins downstream of the 25th Street West Bridge by placing three foot high earthen berms in the channel and suitable downstream locations. This alternative would reduce the overall recharge basin acreage from 14.6 acres to 8.4 acres, substantially diminishing the capacity of the recharge facility by about 50 percent. Based on the substantial in-channel disturbance necessary to construct and maintain the in-channel basins and the substantial reduction in recharge capacity, this alternative was removed from further consideration.
- Alternative Recharge Site Along Amargosa Creek
  - This alternative would involve establishing a recharge facility at another location on Amargosa Creek. Upstream locations are not viable because they are on the other side of the San Andreas Fault where captured water would not recharge the Antelope Valley Groundwater Basin. Therefore, a downstream location would be necessary. However, there are no downstream locations that do not already have stream channel restrictions in the form of armored channels or culverts for approximately 2.7 miles. The nearest downstream location would require a pipeline approximately 4.3 miles long compared to 0.56 miles for the proposed project. Given the substantial additional cost for pipeline construction and the potential need for an intermediate

pump station, this alternative is considered economically infeasible and was removed from further consideration.

5.2 Alternatives Comparison Discussion

5.2.1 The Proposed project

The UAP would include the following components:

- A 19.4-acre recharge facility, including recharge basins and infrastructure consisting of:
  - 5.4 acres in two in-channel recharge basins;
  - 14.3 acres in six off-channel recharge basins;
  - 2,975 feet of 36-inch diversion pipeline from the California Aqueduct to the diversion structure in Amargosa Creek;
  - 5,100 feet of 52-inch low pressure collector pipeline from the diversion structure along the margins of the recharge basins;
- A 38-acre community nature park containing multi-use pathways, picnic tables, interpretive plaques, and habitat enhancement/restoration areas;
- A 22-acre native habitat conservation area; and
- Seven acres of open stream channel.

The purpose of this recharge facility would be to provide increased groundwater recharge to the Antelope Valley Groundwater Basin. The recharge facility would receive water from two sources, the State Water Project (SWP) and the Amargosa Creek watershed. The recharge facility would consist of two in-channel basins and six off-channel basins designed to retain water and allow it to infiltrate into the ground. Based on the proposed operation schedule where recharge basins would be out of operation during summer months when water may not be available, the recharge facilities would recharge between 14,500 AFY to 53,000 AFY, and would average approximately 24,300 AFY. The total combined (SWP water and Amargosa Creek stormwater runoff) annual average available water for the UAP would be approximately 25,400 AFY.

5.2.2 Alternatives to the Proposed project

The following alternatives were evaluated in this EIR.

5.2.2.1 Alternative 1 – No In-Channel Recharge Basins

The No In-Channel Recharge Basins Alternative would include the following components:

- A 14.3-acre recharge facility, including recharge basins and infrastructure consisting of:
  - No acres of in-channel recharge basins;
  - 14.3 acres in six off-channel recharge basins;
  - 2,975 feet of 36-inch diversion pipeline from the California Aqueduct to the diversion structure in Amargosa Creek;
  - 5,100 feet of 52-inch low pressure collector pipeline from the diversion structure along the margins of the recharge basins;

- A 38-acre community nature park containing multi-use pathways, picnic tables, interpretive plaques, and habitat enhancement/restoration areas;
- A 22-acre native habitat conservation area; and
- 12.4 acres of open stream channel.

In all other respects, this alternative would be constructed and operated in the same manner as the proposed project.

5.2.2.2 Alternative 2 – Reduced Off-Channel Recharge Basin Area

The Reduced Off-Channel Recharge Basin Area Alternative would include the following components:

- An 13.8-acre recharge facility, including recharge basins and infrastructure consisting of:
  - 5.4 acres of in-channel recharge basins;
  - 8.4 acres of off-channel recharge basins;
  - 2,975 feet of 36-inch diversion pipeline from the California Aqueduct to the diversion structure in Amargosa Creek;
  - 3,100 feet of 52-inch low pressure collector pipeline from the diversion structure along the margins of the recharge basins;
- A 46-acre community nature park containing multi-use pathways, picnic tables, interpretive plaques, and habitat enhancement/restoration areas;
- A 22-acre native habitat conservation area; and
- Seven acres of open stream channel.

In all other respects, this alternative would be constructed and operated in the same manner as the proposed project.

5.2.2.3 Alternative 3 – Alternative Aqueduct Pipeline Routes

The Alternative Aqueduct Pipeline Routes Alternative would include the following components:

- A 19.7-acre recharge facility, including recharge basins and infrastructure consisting of:
  - 5.4 acres of in-channel recharge basins;
  - 14.3 acres of off-channel recharge basins;
  - Either:
    - A) 2,300 feet of 36-inch diversion pipeline from the California Aqueduct to the diversion structure in Amargosa Creek via the Amargosa Creek bed; or
    - B) 2,200 feet of 36-inch diversion pipeline from the California Aqueduct to the diversion structure in Amargosa Creek via a pipeline trenched along the northern bank of Amargosa Creek;
  - 5,100 feet of 52-inch low pressure collector pipeline from the diversion structure along the margins of the recharge basins; and
- A 38-acre community nature park containing multi-use pathways, picnic tables, interpretive plaques, and habitat enhancement/restoration areas;

- A 22-acre native habitat conservation area; and
- Seven acres of open stream channel.

In all other respects, this alternative would be constructed and operated in the same manner as the proposed project.

5.2.2.4 Alternative 4 – No Project Alternative

The No Project Alternative would not involve development of either the recharge facilities, restoration of habitat, or construction of visitor-serving amenities of the proposed project. It could involve development of residential housing as the site is currently zoned residential. Therefore, the impacts associated with converting the site for housing could occur if the project is not undertaken.

5.3 CEQA Requirements to Evaluate Alternatives

CEQA Guidelines Section 15126 requires that an EIR present a range of reasonable alternatives to the proposed project, or to the location of the project, that could feasibly attain most of the basic project objectives, but would avoid or substantially lessen any significant impacts. Section 15126.6 also requires an evaluation of the comparative merits of the alternatives. An EIR is not required to consider alternatives that are infeasible, such as those described in Section 5.1.2 and previously summarized.

5.3.1 CEQA Alternatives Comparison

Table 5.3-1 compares key parameters among the proposed project, alternatives, and the No Project Alternative. Table 5.3-2 summarizes the results of the CEQA significance analysis for all alternatives in each resource area, as discussed in detail in Chapter 3. Table 5.3-3 compares the relative impacts of the alternatives to the proposed project indicating whether the impact associated with the alternative is much less than, less than, or approximately the same as the impact associated with the proposed project.

Table 5.3-1. Comparison of Alternative Characteristics

Parameter	*Proposed project*	*Alternative 1 No In-Channel Basins*	*Alternative 2 Reduced Off-Channel Basins*	*Alternative 3 Alt Pipeline Routes*	*No Project Alternative*
Site Acreage	87	87	87	87	87
Recharge Facility Acreage	19.7	14.6	13.8	19.7	0
In-channel Basin acreage	5.4	0	5.4	5.4	0
Off-channel Basin acreage	14.3	14.3	8.4	14.3	0
Diversion Pipeline Length (feet)	3,975	3,975	3,975	2,300 or 2,100	0
Collector Pipeline Length (feet)	5,100	5,100	3,100	5,100	0
Community Park acreage	38	38	44.2	38	0
Native Habitat Conservation area acreage	22	22	22	22	0
Open stream channel acreage	7	12.4	7	7	12.4

Table 5.3-2. Comparison of Estimated Impact Significance by Alternative

Environmental Resource Area	*Proposed project*	*Alternative 1 No In-channel Basins*	*Alternative 2 Reduced Off-channel Basins*	*Alternative 3 Alt Pipeline Routes*	*No Project Alternative*
Aesthetics and Visual Resources	LTS	LTS	LTS	LTS	US
Air Quality (greenhouse gas)	US	US	US	US	US
Biological Resources	LTS w/M	LTS w/M	LTS w/M	LTS w/M	US
Cultural Resources	LTS w/M	LTS w/M	LTS w/M	LTS w/M	LTS w/M
Geology and Soils	LTS	LTS	LTS	LTS	LTS
Hazards and Hazardous Materials	LTS	LTS	LTS	LTS	LTS
Hydrology and Water Quality	LTS w/M	LTS w/M	LTS w/M	LTS w/M	LTS
Land Use	LTS	LTS	LTS	LTS	LTS
Noise (construction)	LTS	LTS	LTS	LTS	LTS
Transportation and Circulation	LTS	LTS	LTS	LTS	LTS
Other Issues Areas*	LTS	LTS	LTS	LTS	LTS

Notes:
LTS = Less than Significant
LTS w/ M = Less than Significant with Mitigation
US = Unavoidable Significant: cannot be mitigated to Less than Significant
* Note that the proposed project would result in beneficial recreational impacts by virtue of adding a public open space with amenities to the local park system.

Table 5.3-3. Comparison of Estimated Impact Magnitude by Alternative

Environmental Resource Area	*Proposed project*	*Alternative 1 No In-channel Basins*	*Alternative 2 Reduced Off-channel Basins*	*Alternative 3 Alt Pipeline Routes*	*No Project Alternative*
Aesthetics and Visual Resources	LTS	≈	≈	≈	>
Air Quality (construction)	US	≈	≈	≈	>
Biological Resources	LTS w/M	<	<	≈	>
Cultural Resources	LTS w/M	≈	≈	≈	≈
Geology and Soils	LTS	≈	≈	≈	≈
Hazards and Hazardous Materials	LTS	≈	≈	≈	≈
Hydrology and Water Quality	LTS w/M	<	≈	≈	>
Land Use	LTS	≈	≈	≈	≈
Noise	US	≈	≈	≈	>
Transportation and Circulation	LTS	≈	≈	≈	>
Other Issues Areas	LTS	≈	≈	≈	>

Notes:
> = Greater than
< = Less than
≈ = Approximately the same

5.3.2 Environmentally Preferred Alternative

The proposed project and all alternatives would result in unavoidable significant impacts to air quality (GHG gas emissions during construction or operation). The No Project Alternative would result in unavoidable significant impacts on aesthetics and visual resources with construction of housing on the project site; air quality (GHG), and biological resources (loss of habitat). For all other issue areas and alternatives, the impacts are less than significant, either without the need for mitigation or with the application of appropriate mitigation measures.

The No Project Alternative involves not proceeding with the proposed project. However, given that the site is currently zoned residential, if this designation is not changed, portions of the site could be developed for housing. Constructing housing would involve extensive grading and the conversion of degraded and natural habitat to residential use. Therefore, it is likely that housing would result in the removal of existing natural habitat. There would also be no restoration of native habitat and there would be extensive visual alteration of the site from its present condition. In addition, the No Project Alternative would result in a substantial change in the visual character of the site, greater air pollutant emissions, more noise, more traffic, and most likely less recreational open space than the proposed project. Therefore, the No Project Alternative would not be the Environmentally Superior Alternative. It would involve greater alteration of the natural environment than the proposed project.

Among the other alternatives to the proposed project evaluated in this EIR, Alternative 1 (No In-Channel Recharge Basins) would have the lowest overall environmental impact by virtue of not constructing the in-stream recharge basins. Not having in-channel basins results in somewhat lower overall impacts to biological resources and hydrology and water quality than the proposed project by minimizing disturbance in the creek channel as well as the opportunities during construction and operation for hazardous materials releases or diversion of stream flows from equipment working in the creek bed. These impacts can be mitigated to less than significant levels, but their risk of occurrence would be eliminated by not having in-stream recharge basins.

6 Other Required Sections

6.1 Unavoidable Significant Impacts

Proposed project development would result in significant, unavoidable impacts on the following resources:

Air Quality: Project construction would generate air pollutants from the combustion of diesel fuels. As a consequence, there would be emissions of greenhouse gases (GHG). Any incremental increase in GHG emissions is considered significant.

Since the analysis assumes the use of construction equipment that complies with EPA non-road Tier 3 standards, no other feasible mitigation measures are available to reduce GHG construction emissions for the proposed project. Project construction and operation would increase GHG emissions relative to baseline levels and therefore GHG impacts would be significant and unavoidable.

6.2 Significant Irreversible Impacts

6.2.1 Introduction

Pursuant to Section 15126.2(c) of the State CEQA Guidelines, an EIR must consider any significant irreversible environmental changes that would be caused by the Project should it be implemented. Section 15126.2(c) states:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impact and, particularly, secondary impacts (such as highway improvements which provide access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

6.2.2 Analysis of Irreversible Changes

Resources committed to this Project include the 87 acres of land, fossil fuels, capital, labor, and construction materials such as rock, concrete, gravel, and soils. Non-renewable resources, such as fossil fuels, concrete, asphalt, and metal alloys would be required for the physical construction of the Project. However, the Project does not represent an uncommon construction project that uses an extraordinary amount of raw materials in comparison to other urban or industrial development projects of similar scope and magnitude.

Fossil fuels and energy would be consumed in the form of diesel, oil, and gasoline used for equipment and vehicles during construction and operation activities. During operations, diesel, oil, and gasoline would be used in facility maintenance and vehicles. Electrical energy would be consumed for pumping from the SWP during operations. These energy resources would be irretrievable and irreversible.

Non-recoverable materials and energy would be used during construction and operations, but the amounts needed would be accommodated by existing supplies. Although the increase in the amount of materials and energy used would be insignificant, they would nevertheless be unavailable for other uses.

CEQA Guidelines Section 15126.2(c) requires that an EIR evaluate the irretrievable commitments of resources to assure that current consumption is justified. The irretrievable commitment of resources required by the proposed Project is justified by the objectives of the Project, the primary purpose of which is to

recharge the Antelope Valley Groundwater Basin using surface water supplies originating from SWP water (via the California Aqueduct) and stormwater in the Amargosa Creek. The project would enable the storage of imported SWP water during the winter and spring when the demand and environmental impacts in the Bay-Delta region are lower, and when water is available within the user's allocation. In addition, the project would provide an economic benefit to the Antelope Valley area by facilitating the future availability of water for domestic, industrial and agricultural purposes.

6.3 Growth Inducement

6.3.1 Introduction

The CEQA Guidelines require an EIR to discuss the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. This includes ways in which the proposed project would remove obstacles to population growth or trigger the construction of new community services facilities that could cause significant effects (State CEQA Guidelines, Section 15126.2).

6.3.2 Summary of Growth-Inducing Impacts

The proposed Project would have limited growth-inducing impacts by providing additional water availability in future years that could support growth in housing, agriculture and industrial activity. The analysis below addresses how the proposed project would directly or indirectly stimulate significant economic or population growth in the surrounding area.

6.3.2.1 Direct Growth-Inducing Impacts

A project would directly induce growth if it would remove barriers to population growth (e.g., by facilitating new homes and businesses). The project would provide more secure future water supplies and, thereby, remove barriers to growth by relaxing an existing constraint to growth.

6.3.2.2 Indirect Growth-Inducing Impacts

A project would indirectly induce growth if it would trigger the construction of new community service facilities that could increase the capacity of infrastructure in an area that currently meets the demands (e.g., an increase in the capacity of a sewer treatment plant or the construction or widening of a roadway beyond that which is needed to meet existing demand). The project would allow a modest increase of water in future years and would thereby expand the capacity of infrastructure such that the extra capacity could indirectly induce growth by facilitating further development.

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